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Elements
OF
DENTAL MATERIA MEDICA
AND
THERAPEUTICS.
WITH
PHARMACOPŒIA.

LONDON:
PRINTED BY JOHN BALE AND SONS,
GT. TITCHFIELD STREET.

1882

ELEMENTS
OF
DENTAL
MATERIA MEDICA
AND
THERAPEUTICS,
WITH
PHARMACOPŒIA.

THIRD EDITION.

BY

JAMES STOCKEN, L.D.S.Eng.
Pereira Prizeman for Materia Medica.

ASSISTED BY

THOMAS GADDES, L.D.S.Eng. & Edin.

LONDON:
J. & A. CHURCHILL, NEW BURLINGTON STREET

1882.

TO

THE MEDICAL OFFICERS & LECTURERS

OF THE

NATIONAL DENTAL HOSPITAL AND COLLEGE,

THIS MANUAL IS DEDICATED

AS A MARK OF SINCERE REGARD.

PREFACE TO FIRST EDITION.

THIS work is presented to the Dental Profession in the hope of supplying a long felt desideratum. There are elaborate works on general Materia Medica and Pharmacology, but none having special reference to Dentistry. This fact induced the Medical Staff of the National Dental Hospital to depute the Author to compile a manual for the use of the Hospital, and he undertook the task for that particular purpose. Subsequently, however, it was urged upon him to extend its scope with a view to publication.

Since its appearance in sections in *The Monthly Review of Dental Surgery*, the matter has been thoroughly revised, and several additions have been made.

The Author has received, and here desires gratefully to acknowledge, the valuable assistance so kindly proffered by his friends, Mr. Braithwaite and Mr. Gaddes.

He has also to acknowledge his obligations to the various writers whose works he has consulted.

21, Endsleigh Gardens, N.W.
September 28, 1877.

PREFACE TO SECOND EDITION.

THE first edition of this work was disposed of in less than four months. As so short a time had elapsed since its appearance, the author's first intention was to re-issue the work in its original form, making only a few clerical corrections; but anticipating the results of the noble efforts then being made to raise the intellectual status of the Dental Profession, and viewing the probability that at no distant date Dental Materia Medica might form part of the Curriculum of the Dental Student, he decided to enlarge its scope. The result of that decision has been the addition of considerable fresh matter, and the volume, as now published, is double the size of its predecessor.

The new matter includes Tables relating to Weights and Measures, Symbols, Poisons and Notation. The Notation Tables are the work of the Author's friend, Mr. Braithwaite, and he here desires to again thank him for his valuable assistance.

He also again desires to express his obligation to Mr. Gaddes for the valuable assistance rendered by him, particularly in the revision of the work.

21, Endsleigh Gardens, N.W.
September, 1878.

PREFACE TO THIRD EDITION.

THE second edition having been disposed of sooner than was anticipated, and the desire to take full advantage of the considerable increments, particularly of a specially Dental character, to the sub-sciences Materia Medica and Therapeutics, have led to the necessity for a new edition rather than a re-issue. This undoubted recent advancement of Dental Pharmacology, and the continued demand for a book having such a special and somewhat limited field of application as has the subject matter of this work, are reasons for much satisfaction, and the Authors hope that they have been successful in their efforts to bring this edition up to the present standard of knowledge and in keeping with the rapid progress of the Dental Profession.

The old matter has been revised, and in many instances important additions have been made to it, while several new preparations have also been inserted, An "Index of Diseases" has been compiled, the advantages of which will be apparent. Altogether, this volume is one-fifth larger than the previous edition; and these different incidences have caused considerable delay in bringing it out.

Obligations are due to the Secretary of the Royal Humane Society, for the use of the wood-cuts illustrating Sylvester's method of artificial respiration.

September, 1882.

TABLE OF CONTENTS.

PAGE

Title ... ... III.

Dedication ... ... IV.

Preface to First Edition ... ... V.

Preface to Second Edition ... ... VII.

Preface to Third Edition ... ... IX.

Table of Contents ... ... XI.

List of Authorities Consulted ... ... XIV.

Definitions 1

Psychical or Mental Remedies 2

  External 2

  Internal 2

Physical, but Imponderable Remedies 3

  Light 3

  Heat... 3

  Cold... 4

  Electricity 4

  Magnetism 5

Hygienic Remedies 6

  Food 6

  Exercise 8

  Climate 10

Surgical and Mechanical Remedies 14

Pharmacological Remedies 14

  Their Divisions 14

PAGE
General Pharmacology 15
  Modes of ascertaining the Effects of Medicines 16
  Active Forces of Medicines 19
  Changes which Medicines undergo in the Organism... 21
  Physiological Effects of Medicines 21
  Therapeutical Effects of Medicines 36
  Parts to which Medicines are applied 38
  Classification of Medicines 44
Definitions of Terms denoting the Properties of Remedial Agents 44
The Action of Medicines modified according to the Form of Administration and Time of Exhibition 57
Forms of Medicines 59
Chemical Notation 61
  Old Theory... 61
  New Theory 62
  Atoms 63
  Molecules 64
  Quantivalence 64
  Tables of Quantivalents 65
Elementary Bodies (Symbols and Atomic Weights) 70
Weights and Measures 71
Approximate Measurement... 76
Table of the Number of Drops equivalent to a Drachm of Water 76
Pulsation per Minute at Various Ages 77
Respiration per Minute at Various Ages 77
Table of Doses 77

PAGE
Special Pharmacology 78
Table of Poisons, Symptoms and Antidotes ... 286
List of Authors of Formulæ in Dental Pharmacopœia 304
Dental Pharmacopœia 305
Abbreviated Terms 359
Index of Diseases 366
General Index, with Table of Doses 376

LIST OF AUTHORITIES CONSULTED.

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Beasley's Pocket Formulary.
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Bernay's Notes on Chemistry.
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Garrod's Materia Medica and Therapeutics.
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Gmelin's Handbook of Chemistry.
Harris' Dental Surgery.
Hoblyn's Dictionary.
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Transactions of International Medical Congress.
Transactions of Odontological Society.
Turner's Chemistry.
United States' Dispensatory.
Ure's Dictionary.
Waring's Practical Therapeutics
White's Dental Materia Medica.
Year Book of Pharmacy, &c., &c.

ERRATA, ETC.

For "Gelseminum" read *Gelsemium.*

Page 116, last line but four, for "Tritici" read *Triticum.*

Page 142, first line, for "Calcis" read *Calcii.*

Page 210, fourteenth line, for "Folia" read *Folium.*

Page 306, for "Calx Sacharata" read *Calx Saccharata.*

Page 319, under "Gargarisma Krameriæ," add

Radicis Krameriæ Contusæ	℥ss
Aquæ	℥x

Page 347, for "Acidi Hypophosphorosi" read *Acidi Hypophosphorici.*

Page 348, last line, add 1 to 6 drachms.

Page 110, for dose of Ammoniæ Acetatis Liquor, instead of "10 to 40 mins." substitute, 2 *to* 6 *drachms.*

ELEMENTS

OF

DENTAL MATERIA MEDICA

AND

THERAPEUTICS.

By Materia Medica is understood that branch of medical science which treats of the remedies (or medical materials) employed in the prevention and treatment of disease.

By Therapeutics the science which teaches the uses and effects of those remedies.

All medical materials or remedies are thus divided by Pereira :—

I. Psychical or Mental Remedies.
II. Physical but Imponderable Remedies.
III. Hygienic Remedies.
IV. Surgical and Mechanical Remedies.
V. Pharmacological Remedies.

I.

PSYCHICAL OR MENTAL REMEDIES.

Affections of the mind, by their influence over the corporal functions, favour or oppose the actions of morbific causes, and modify the progress and treatment of diseases. The methodical application of mental actions as remedies constitutes the *psychical method of cure.* Regarded as therapeutical agents they are by no means unimportant or to be neglected, though their employment is necessarily limited on account of the difficulty experienced in producing, regulating, and controlling them.

They are of two kinds :—

(*a.*) External.

(*b.*) Internal.

(*a.*) **External or objective** actions of the mind include those portions of our consciousness which come to us through the organs of sense, which are those of sight, hearing, smell, taste and touch. These objective actions are frequently excited for therapeutical purposes. They act either as excitants, or as soothing and tranquillizing agents. Thus strong light and loud noises are excitants, while monotonous impressions on the optic and auditory nerves dispose to sleep.

(*b.*) **Internal or Subjective** actions of the mind. This division comprises the intellect and the emotions. By the intellect we understand the products of thought, which are conception (or simple apprehension), reason, and judgment; and by emotion the undefinable (subjective) feeling of pleasure or pain, love, fear, anger, &c.

The therapeutical regulation of the emotions or passions is principally resorted to in nervous or mental disorders, and consists in the repression or encouragement of particular feelings and desires, according to the circumstances of the case.

The remedial influence of music, for example, is not due simply to sensation, or the mere perception of sounds, but to its effect upon the emotions and the imagination.

II.

PHYSICAL, BUT IMPONDERABLE REMEDIES.

These are:—

(*a.*) Light.
(*b.*) Heat.
(*c.*) Cold.
(*d.*) Electricity.
(*e.*) Magnetism.

(*a.*) **Light.**—Solar light possesses several distinct properties or qualities: it illuminates bodies; by conversion into heat, and by effecting in them various chemical changes, it raises their temperature; and, on some, it confers the faculty of being self-luminous or phosphorescent. Light is a vital stimulant, and it also modifies the action of several medicines.

(*b.*) **Heat.**—All living beings, but especially the animals denominated *warm-blooded*, generate heat. To all a certain temperature (which varies in different individuals) is essential to the maintenance of life, and hence caloric or heat is a vital stimulus. Increased beyond a certain degree, it ceases to be vivifying, and may cause inflammation or apoplexy; heat may exhaust the vital energies by its prolonged stimulant operation; or when the action is very violent, as with the actual cautery, it may decompose the organised tissues by its chemical influence. The use of a blast of hot air to obtund sensitive dentine is a familiar example of the application of caloric in dental practice. The effects of caloric on living beings are threefold—physical, chemical and vital.

(*c.*) **Cold.**—The general effects of cold on living bodies are depressant and sedative, dimininishing vital action if the cold be intense, and, if its application be continued, terminating in death. The influence of cold as of heat is threefold—physical, chemical and vital.

(*d.*) **Electricity.**—The agent or force denominated electricity appears to exist in all terrestrial bodies, either in an active or in a passive condition. The former state may be induced by a variety of circumstances, which are denominated modes of electrical excitement, or sources of electricity; and the bodies in which this condition of electrical activity is made manifest are said to be electrified.

In every mode of effecting electrical excitement there are two opposite or antagonistic electricities set free—the one, called positive or vitreous; the other, negative or resinous.

The physical and chemical phenomena produced by an electric discharge vary somewhat according as it takes place from a positive or a negative surface. The physiological effects appear to be the same, though, formerly, positive electricity was supposed to be stimulant, while negative electricity was thought to be sedative.

Electricity is distinguished from every other physical agent by its power of affecting all our senses; while light, for example, excites the organ of vision only; heat, that of common sensation only; and so of the rest.

The electric current, while it acts like other stimulants on the nerves of sensation, also excites reflex action.

On the nervous centres its effects are still more remarkable. A powerful charge of electricity passed through the brain produces instant death, and a less powerful one concussion of the brain; therefore, the physiological effects of the electric current are greatly modified by its intensity.

The application of electricity to obtund the pain of tooth extraction has been advanced at different times. The use of the galvanic cautery for destroying the tooth pulp, and for other surgical purposes, is recognised in practice.

(*e.*) **Magnetism** in some instances has appeared to exercise a most remarkable influence over neuralgic pains and spasmodic affections. But in a large proportion of cases it has failed to produce any obvious effect. Mesmerism has frequently been employed to produce anæsthesia; but its action may be regarded as indetermined.

III.

HYGIENIC REMEDIES.

The Hygienic Remedies are—

1. Food.
2. Exercise.
3. Climate.

1. **Food.**—All substances employed as food are compounds, and in many cases mechanical mixtures, or chemical combinations of two or more compounds, and may be arranged under three heads :—

(*a.*) Chemical elements of food.
(*b.*) Alimentary principles.
(*c.*) Compound aliments.

(*a.*) *Chemical Elements of Food.*—The chief simple or elementary substances of food are carbon, hydrogen, oxygen, nitrogen, phosphorus, sulphur, iron, chlorine, sodium, calcium, potassium, magnesium, fluorine, silicon, manganese, aluminium, copper. The first four exist in much larger quantity than any of the others; while those towards the end of the list are present only in minute quantities.

(*b.*) *Alimentary Principles.*—These are substances which consist of two or more chemical elements, and are constituents of the compound aliments. They are about seventeen in number—thus, fibrine, albumen, caseine, gluten, gelatine, oil or fat, starch, sugar, gum, pectine, alcohol; citric, tartaric, &c., acids, common salt, earthy phosphates, certain ferruginous compounds, potash salts, water. They may be arranged according to the chemical nature of the principles, as—

- Food
  - Inorganic
    - Common Salt, Earthy Phosphates, &c.
  - Organic
    - Nitrogenous
      - Albumen, Fibrine Caseine, &c.
    - Non-nitrogenous
      - Hydro-carbons or fats,
      - Carbo-hydrates -- starch, sugar, &c.,
      - Other Ternary Principles--Citric Acid, Alcohol, &c.

The inorganic alimentary principles are water, various salines, &c. The nitrogenous are those principles which build up the tissues of the body; yet, by the separation of the nitrogen in the form of urea, a carbonaceous compound is left which may be appropriated to the production of heat. The non-nitrogenous principles are directly or indirectly the source of power, and in this sense is fat stored up for subsequent appropriation.

(*c.*) *Compound Aliments.*—These are mechanical mixtures, or chemical combinations of two or more alimentary principles. They are solid or liquid, the latter being termed drinks. Those which are employed at the table for flavouring or seasoning are called condiments.

In rickets and conditions in which there are indications of imperfect supply of lime salts to the developing bones and teeth, much benefit is frequently derived from the use of a therapeutic dietary which contains a percentage of earthy salts. The calcification of certain of the permanent teeth begins *in utero*, and of others during the first year of life, while the infant is yet dependant upon the mother. In such case the dietetic treatment must be directed upon the mother. It is not the food taken, but rather that which is digested and assimilated which is of service and therapeutic value.

2. **Exercise.**—Exercise, regulated according to the conditions of the individual, is one of the most important of our therapeutic agents. In its most extensive signification it has reference to the action of all the organs of the animal economy, yet it is usually limited to those of locomotion, and in this sense it is here employed.

The exercise of the muscular system is followed by several effects, which may be conveniently arranged under four heads :—

(*a.*) Mechanical effects.
(*b.*) Organic or vital effects.
(*c.*) Nervous effects.
(*d.*) Psychical or mental effects.

(*a.*) *Mechanical Effects.* — Whenever the muscles are called into activity they exert a local influence, of a mechanical kind, on the blood-vessels in their immediate vicinity, and thereby accelerate the circulation of the blood. This is followed by an augmentation of the animal heat; and if the exercise be of a kind to call into activity a considerable number of muscles, the general circulation soon participates in the effects; the pulse is quickened, and respiration and secretion are increased, while oxidation and assimilation are promoted.

(*b.*) *Organic or Vital Effects.*—These include the augmentation of volume, of firmness, of elasticity, and of strength or power, which a muscle acquires from frequent but moderate use. Compare the large jaws and strong muscles of those individuals or races of man who habitually live upon hard foods, with the small, soft muscles, ill-developed and disproportioned jaws and teeth of those who live upon food which does not require much mastication. Function begets structure.

(*c.*) *Nervous Effects.*—The action of the muscles can only be effected through the medium of the nervous centres and nerves; the latter, therefore, are called into activity, and through them the whole system becomes influenced by the exercise of a number of muscles.

(*d.*) *Psychical or Mental Effects.*—To this head belong the different mental effects produced either by agreeable or disagreeable, by voluntary or compulsory exercise. Moderate and agreeable exercise acts as a salutary excitant to the intellectual faculties and sensations; and in this manner it has a tonic and stimulating influence on the system, and is calculated to be beneficial in a great variety of complaints. When used immoderately, exercise exhausts both the mental and bodily powers, and produces debility.

Exercise may be divided into *active*, *passive*, and *mixed*. To the first belong walking, running, leaping, fencing, &c.; to the second, carriage exercise and sailing; while horse exercise belongs to the third division.

3. **Climate.**—Climatic remedies include those topographical, atmospheric, and other conditions of a region or country, which have a beneficial or injurious influence on health.

The subject may be divided into :—

The phenomena of climates;

Climates most frequently used as therapeutic agents;

Diseases for which change of climate is employed.

We shall briefly consider the two latter aspects of the question in relation to the phenomena of climates, or the most obvious circumstances which affect the climate of a region or country, as Temperature, Humidity, Purity of the air, Wind, Atmospheric pressure, Intensity of light, Atmospheric equability or vicissitudes, Soil, Amount of vegetation, and Proximity to the sea.

(*a.*) *Temperature.*—In considering the temperature of a place, we must regard, not merely its annual mean, but its extremes. Inland tracts of country experience greater extremes than the coasts, in consequence of the land being more rapidly heated and cooled than water. Hence it attains a higher temperature in summer, and a lower one in winter.

Warm climates are adapted for pulmonary invalids—the rheumatic, the scrofulous, the paralytic, and those who suffer from the effects of feeble circulation. Cold or, rather, moderately cool climates are bracing, and fitted for relaxed constitutions. Cold weather and cold climates are injurious to the aged, the paralytic, the phthisical, the scrofulous, the diabetic and the rheumatic.

(*b.*) *Humidity.*—Evaporation from the cutaneous and pulmonary surfaces is augmented by a dry, and checked by a damp or moist, state of the atmosphere. But the transudation which depends on vital action is augmented by warmth and moisture. A soft climate is adapted for chronic bronchitis of a dry irritable kind, and for some other maladies attended with a harsh, dry, parched skin. A dry climate, on the other hand, promotes evaporation, and therefore is better fitted for relaxed, languid constitutions, with profuse secretion and exhalation.

(*c.*) *Purity of the Atmosphere.*—A pure condition of the atmosphere is an essential element of all healthy climates. The greater mortality of cities than of the country is principally referable to the respiration of air vitiated by manufactories, and the congregation of a large number of persons in a limited space. Air contaminated by the exhalations or effluvia from wet lands, swamps, animal and vegetable substances in a state of decomposition, and human bodies, especially those of the sick, is a prolific cause of disease. The aëriform poison thus introduced into the atmosphere is called *miasma* or *malaria*.

(d.) Wind.—Wind greatly modifies the effects of temperature on the body. Sir James Clark has justly observed, "the influence of temperature on the living body is indicated much more accurately by our sensation than by the thermometer." The humidity and the purity of the air are greatly modified by the motion or calmness of the air.

(e.) Atmospheric Pressure.—It is difficult to estimate, separately from other co-existent influences, the precise effects which result from variations in the pressure of the atmosphere; but that they do exert a powerful influence on the animal economy there can be no doubt. In consequence of diminished atmospheric pressure the superficial vessels become gorged and secretion is readily effected; while, from the humid condition of the air, evaporation does not take place. Hence arise a feeling of languor and fatigue, and sweating on the slightest exertion.

(f.) Intensity of Light.—This has already been considered. *Vide* p. 3.

(g.) Atmospheric Equability or Vicissitudes.—Rapid atmospheric changes are always injurious to health, and therefore climates which are subject to sudden changes of temperature, or of humidity, or of atmospheric pressure, or of wind, are invariably unhealthy.

These changes are not always observable by the healthy and robust.

(*h.*) *Soil.*—The climate of a place is also greatly modified by the quality of the soil. Sandy, gravelly, and chalky soils are in general most salubrious; they will allow the rain to percolate rapidly through them, and are therefore called dry soils, particularly the two former. They are fitted for relaxed constitutions with profuse secretions. Clayey soils are less salubrious; they are wet soils, the rain being retained on the surface. They are most obnoxious to relaxed and rheumatic constitutions.

(*i.*) *Amount of Vegetation.*—The character of a climate is often affected by the exuberance or deficiency of vegetation. Jungles, woods, and forests protect the earth from the action of the solar rays, and are, in consequence, often the residence of moisture and decaying vegetation analogous to a marsh.

(j.) Inland and Maritime Localities.—In general the climate of places on the sea-shore is more humid than those of inland localities; but to this statement there are many exceptions.

These are some only of the circumstances which affect the quality or character of a climate. Others doubtless exist. For example, Electricity, Magnetism, and the amount of ozone.

IV.

SURGICAL AND MECHANICAL REMEDIES.

Among these may be mentioned extraction of teeth, lancing the gums, removal of tumours, opening of abscesses, treatment of traumatic lesions, &c.

V.

PHARMACOLOGICAL REMEDIES.

These may be divided into
(*a.*) Medicines.
(*b.*) Aliments.
(*c.*) Poisons.

(*a.*) **Medicines** are substances, not essentially alimentary, used in the treatment of diseases, and which, when applied to the body, alter or modify its vital actions.

(*b.*) **Aliments** are vital stimuli which vivify, since they are assimilated to our organs and become integrant parts of the living body.—(See *Food* p. 6.)

(*c.*) **Poisons** are distinguished from medicines principally in the *degree* of their effects, and the uses to which they are applied; for the most powerful poisons become, when administered under proper regulation, very valuable medicines.

Having in the foregoing pages given a curt account of the primary sections into which remedies are conveniently classed, we now proceed to consider that branch of acology which deal with medicines, namely,

PHARMACOLOGY.

Pharmacology is General and Special.

GENERAL PHARMACOLOGY.

General Pharmacology treats of medicines generally. It is divided into

Pharmacognosy, which deals with the origin, varieties, properties, quality, and purity, of unprepared medicines or simples:

Pharmacy, which embraces the collection, preparation, preservation, and dispensing of medicines:

Pharmacodynamics, as applied to the power, effects, and uses of medicines.

For the purposes of this work it will be more expedient to consider General Pharmacology in the following order, viz.:—

I. Modes of ascertaining the effects of medicines.

II. Active forces of medicines.

III. Changes which medicines undergo in the organism.

IV. Physiological effects of medicines.

V. Therapeutical effects of medicines.

VI. Parts to which medicines are applied.

VII. Classification of medicines.

I. MODES OF ASCERTAINING THE EFFECTS OF MEDICINES.

There are four principal methods which have been resorted to for the purpose of determining the effects of medicine:—

A. The sensible qualities of medicines.
B. The natural-historic properties.
C. The chemical properties.
D. The dynamical properties.

A. **The Sensible Qualities of Medicines.**—Colour, taste, and odour. This classification is necessarily very imperfect, owing to the impossibility of defining sensations. Moreover, their use is very limited in consequence of these properties having no necessary relation to the medicinal powers.

B. **The Natural-Historic Properties.**—External form and structure are made use of, in natural history, to determine the affinities of natural bodies, hence they are denominated *natural-historic properties*. These are of *a*. Minerals, *b*. Vegetables, *c*. Animals.

(*a*.) *Minerals*.—No conclusions respecting the medicinal properties of minerals can be deduced from crystalline form and structure.

(*b*.) *Vegetables*.—It has long been supposed that those plants which resemble each other in their external appearances are endowed with analogous medicinal properties. Vegetable substances owe their peculiar qualities to the structure, and consequent action, of the organs producing them. Differences in the structure of an organ are attended with differences of function, and therefore with differences in the qualities of its products. Consequently the medicinal qualities of plants of the same Natural Order are frequently similar or analogous. In a very large number of instances there exists an analogy between the external forms and medicinal properties of plants, so that we can sometimes predict the active principle and mode of operation of a vegetable merely by knowing to what part of a natural arrangement it belongs.

There exist, however, many anomalies or exceptions to these statements. Plants of the same natural order are frequently endowed with dissimilar medicinal properties, and plants of dissimilar structure are sometimes endowed with similar or very analgous medicinal properties.

(*c.*) *Animals.*—No attempts have been made to trace a relation between the toxicological, medicinal or edible properties and the anatomical structure of animals.

C. **The Chemical Properties** of medicines have been sometimes resorted to for the purpose of determining the influence which these bodies have over the organism. For we sometimes find that substances possessed of similar chemical qualities operate in an analogous manner on the system. Thus sulphuric, nitric, and hydrochloric acids act very much alike; as do also potash and soda. But these analogies are not common. We frequently meet with substances whose chemical properties are similar, but whose medicinal qualities are most incongruous, as in the case of quinia and morphia. On the other hand, bodies whose chemical properties are exceedingly unlike, sometimes act in a very analogous manner; for example, manna and bitartrate of potash.

D. **The Dynamical Properties**—*Or the effects caused by the application of medicines to the animal body.*—Some have examined the action of medicines on *dead* animal tissues, and drawn inferences therefrom as to their operation on the living organism. But it is admissible only for those remedies the action of which is either physical or chemical.

The examination of the effects of medicines on *living* animals is the only reliable mode of investigation. It may be asserted, as a general rule, that a substance which is poisonous to one species is more or less so to all classes of animals, but modified by the variations in the development of the several organs and functions.

The differences observed in the operation of medicines on our domestic animals are, firstly,—Those relating to the *nervous system*, and which are due to peculiarities in the organization of the same, secondly,—Those due to the structure of the *digestive organs;* and, thirdly—Those arising from peculiarities presented by the *skin*. Thus, opium in man usually produces sleep, sopor, or coma; in animals generally convulsions. In carnivorous animals vomiting can be readily excited, but not so in the herbivora. Again, colocynth, jalap, and gamboge, operate as violent purgatives on man and carnivorous animals, while they have comparatively little effect on the horse and other herbivora.

In ascertaining the action of remedial agents on the human body, it is necessary that we should examine their influence both in healthy and diseased conditions. For, by the first we learn the positive or actual power; while by the second, we see how that power is modified by the presence of disease. Moreover, in the latter condition we sometimes discover remedial influences which our knowledge of the effects of medicines on the healthy body could not have led us to anticipate.

II. ACTIVE FORCES OF MEDICINE.

The production of effects by the application of medicines to the living body depends on the existence of two classes of powers or forces, the one residing in the medicine, and called the *active forces of medicines*, the other in the organism.

These active forces may be manifested either

A. *Physically*,
B. *Chemically*, or
C. *Dynamically*.

A. **Physical Forces.**—Alterations of cohesion, form, relative position, &c., are produced by physical forces. They are attended or followed by organic changes, and therefore a medicine the action of which is simply physical produces two classes of effects—one physical, the other vital; and the whole of its operation may be denominated *physico-vital.*

B. **Chemical Forces.** — If substances having powerful affinities for organic matter be applied to the living tissues, they combine with the organic constituents, and act as *caustics* or *escharotics.* By the destruction of life in one part, alterations of vital actions in neighbouring parts ensue; so that the action of caustics is attended by both chemical and vital effects; and the whole operation may be denominated a *chemico-vital process.* By dilution, the energy of the affinity of caustics for organic matter may be so diminished that they are incapable of destroying the life of the part, but may merely disturb and alter the organic activity. This effect is termed *irritation*, and the agent inducing it is called an *irritant.* In this case the active force is still supposed to be affinity, but the union with the organised tissues is resisted by the vital powers, and a new action is set up. Chemical changes are sometimes produced in the secretions of distant parts by the internal use of certain agents.

C. **Dynamical Forces.** — Some substances exercise a most potent influence over the organism without producing any obvious physical or chemical changes in the organic tissues. Such substances are said to act *dynamically.*

III. CHANGES EFFECTED IN MEDICINES BY THE ACTION OF THE ORGANISM.

The changes which medicines undergo by the action of the forces residing in the organism are either physical, or chemical, or both. They are affected by the mutual affinities which exist between the medicines, or their parts, and the substances with which they are brought into contact, and are modified by the temperature of the body, and by the relative proportions of the reacting agents. The result of these influences is that the medicinal substance may either disappear, or pass out of the system unchanged and undiminished, or it may be decomposed and recognisable in another form. The medicinal activity of a substance is sometimes greatly modified by the chemical changes effected in it: thus, chemical antidotes are effective by rendering poisons insoluble, or forming inert compounds; and insoluble substances, by becoming soluble, acquire medicinal activity.

IV. PHYSIOLOGICAL EFFECTS OF MEDICINES.

There is a most important difference between the effects which medicines produce in health and those which they give rise to in disease, and a knowledge of the action of medicines on the healthy body by no means enables us to determine what will be their effects in disease.

The effects which medicines are capable of producing in healthy individuals are denominated *primary* or *immediate*, and *physiological*.

The PRIMARY effects are those which arise from the direct action of medicines; and the PHYSIOLOGICAL, those which result from the reaction of the organism. Thus the concentrated mineral acids and alkalies decompose the tissues of both living and dead bodies by uniting with some of their constituents, and thereby produce certain chemical alterations which we denominate the effects of the action of these agents. In the living body inflammation is set up in the tissues surrounding the cauterised part; and the vital alterations which are in consequence induced are called the effects of the reaction of the organism.

The action of medicines depends on their active forces, already noticed (page 19); and the re-action of the organism depends on the "vital" force.

A medicine, the action of which is either physical or chemical, gives rise to vital changes by exciting the reaction of the organism, and thus its total effects are neither purely physical nor purely chemical, but physico-vital, or chemico-vital. The effects of some medicines are purely vital: at least neither physical nor chemical changes, simply, are perceptible. In many instances the nature of the action of medicine is unknown.

THE NATURE OR QUALITY OF THE PHYSIOLOGICAL EFFECTS may be

A. *Physico-vital*,

B. *Chemico-vital*, or
C. *Purely vital*.

A. **Physical Effects.**—(*a*.) Some medicines act by their natural form and weight,—thus quicksilver, the hairs of *Mucuna pruriens*, and other substances which undergo little or no change in the alimentary canal, act as foreign bodies.

(*b*.) Many medicines produce physical effects on the body by their influence over the phenomena of endosmose and exosmose. When the serum of the blood is separated from another liquid by an organic membrane, two currents are, in general, established through the membrane: one from the serum to the solution, the other from the solution to the serum. When the intensity of the first current exceeds that of the second, it is called *endosmose of the serum;* but when the intensity of the second current exceeds that of the first, it is termed *endosmose of the solution*. In some few cases this double current or mutual permeation does not take place.

The endosmotic influence of medicines may be exercised before they become absorbed, as well as after their absorption into the blood. In the first case it is exerted through the coats of the vessels on the blood; in the second case it is exercised either through the membrane of the blood corpuscles on the fluid contained within them, or through the coats of the capillaries on the parenchyma of organs.

As absorption and nutrition are phenomena of endosmose, it is obvious that the osmotic property of medicine, by modifying these functions, must greatly contribute to the production of the effects of medicinal agents; though, in the present state of our knowledge, it is not possible to state precisely the exact share which osmosis has in the production of effects. (See also page 28.)

B. **Chemical Effects.**—In consequence of the mutual affinities which exist between some medicines and the constituents of the tissues and of the blood, numerous and important chemical effects are produced in the animal economy.

(*a.*) The *halogenous bodies* (chlorine, bromine, and iodine) abstract hydrogen and unite with bases. Indirectly they sometimes become oxidizers by taking hydrogen from water and setting free the oxygen. In some cases they may, perhaps, combine directly with organic substances.

(*b.*) The *non-metallic combustibles* (sulphur and phosphorus) combine with oxygen and hydrogen.

(*c.*) The *acids* (sulphuric, hydrochloric, nitric, phosphoric, and acetic) combine with bases, decompose many salts, and unite with or decompose the organic constituents of the body.

(*d.*) The *alkalies* unite with acids, decompose some salts, and combine with or decompose the organic constituents of the body.

(*e.*) Most *metallic salts* re-act chemically on the organic tissues, and give rise to the formation of new compounds.

(*f.*) *Tannic* and *gallic acids.*—Tannic acid acts on the animal tissues in virtue of its affinity for their constituents. It forms, with albumen and gelatine, compounds which are insoluble in water; and it also combines with fibrine. Gallic acid becomes absorbed, but, unlike tannic acid, it does not form with gelatine a compound insoluble in water.

(*g.*) *Creasote, alcohol*, and *ether*.—Both creasote and alcohol cause the coagulation of albumen. Ether coagulates the albumen of the egg, but not the albumen of the serum of the blood.

C. **Vital Effects.**—The vital effects of medicines are frequently, though not invariably, preceded or accompanied by appreciable physical and chemical changes.

Medicinal agents may either destroy life or modify vital action; in the former case they become poisons.

Agents which destroy life may also effect the complete destruction of the parts with which they come in contact, as in the case of the substances called corrosives, destroying both organisation and life.

The modifications in the vital manifestations of the system produced by medicines are of three kinds: augmentation, diminution, and alteration of vital action.

Agents which increase vital action are called *stimulants* or *excitants*. Some of them exercise a renovating or restorative influence, and are essential to life, such as heat, air, water, and nutriment. They are the *vivifying* or *vital stimuli*. Others, though not essentially renovating, yet, under certain conditions, exert a local, vivifying, and strengthening influence. They are the true tonics. Others have no renovating or vivifying influence; and their continued action on the body is followed by exhaustion. Such are the alteratives. Agents which directly lower or lessen excitability are termed *sedatives* or *contra-stimulants*. Cold is the most unequivocal sedative.

LOCALITY OF THE PHYSIOLOGICAL EFFECTS OF MEDICINES is either in the part to which these agents are applied, or in more or less distant parts. The former are called *local* or *topical effects;* the latter *remote effects*.

A. **Local or Topical Effects.**—Physical, chemical, and vital changes are produced by the topical action of medicines. Particular medicines appear to act primarily on particular tissues: thus, narcotics on the sensory nerves of the part, acids or irritants on the capillary blood vessels, directly and through the vaso-motor nerves.

But an alteration in the condition of one tissue is in general attended with some change in the state of other tissues; and in that way agents whose primary action is on the nerves may secondarily affect the capillaries; and *vice versâ*, those whose influence is first directed to the capillaries may indirectly affect the nerves.

B. **Remote Effects.**—These, like local effects, include physical, chemical, and vital changes.

Of the various remote effects it cannot be doubted that some are the consequence of others: in other words, some are primary or direct, others secondary or indirect. But so close and intimate are the relations which exist between the different organs and functions, that it is frequently difficult, and sometimes, perhaps, impossible, to distinguish the primary and secondary effects from each other; and it is not improbable that many of the effects often regarded as primary or direct are, in reality, secondary or indirect.

It is generally supposed that there are two modes by which medicines or poisons affect remote parts, namely by *absorption*, or the passage of medicinal or poisonous molecules into the blood; and by *sympathy*, as by an impression transmitted through the nerves.

THE ABSORPTION OF MEDICINES AND POISONS is proved by the following facts:—

1. The disappearance of the medicine or poison from the part to which it was applied.

2. Its detection in a remote part, as in the blood, chyle, animal solids and excretions.

3. The promotion, or retardation, or prevention of its remote effects by the promotion or retardation, or prevention of its circulation.

4. The similarity of remote and topical effects.

5. The medicinal or poisonous quality communicated to the animal solids and fluids.

6. The occurrence of remote effects after the division of the spinal cord, or of all parts except the blood-vessels.

7. The production of the remote effects by

injection of a medicine or poison into the blood.

Rapidity of Absorption.—The rapidity with which matters may be absorbed from the stomach, probably by the blood-vessels chiefly, and diffused through the textures of the body, may be gathered from the history of some experiments by Dr. Bence Jones. From these it appears that even a quarter of an hour after it had been given on an empty stomach, chloride of Lithium was found diffused into all the vascular textures of the body, and into some of the non-vascular, as the cartilage of the hip joint, as well as into the aqueous humour of the eye.

Carbonate of Lithia, when taken in five or ten grain doses on an empty stomach, may be detected in the urine in five or ten minutes; or if the stomach be full at the time of taking the dose, in twenty minutes.

The experiments of Mr. Savory proved that, in some cases, absorption takes place more rapidly from the rectum than from the stomach.

The less dense the fluid to be absorbed the more rapid its absorption.

Absorption is less rapid the fuller and tenser the blood-vessels are; and, as a rule, absorption is quicker the more rapid the circulation of the blood.

Absorption is also effected by the Lymphatics and Lacteals, though it appears to be slow, and confined to certain agents.

Physics of Absorption of Medicines.—The absorption of medicines consists of two acts; first, their passage through the interstices of the organised tissue with which they are placed in contact, and, secondly, their diffusion and circulation.

The passage of medicinal substances through organised tissues is effected by imbibition and endosmose, and is exclusively a physical action. The osmotic currents going on through a membrane between two liquids lessen, and ultimately stop, owing to the membrane becoming saturated with the liquids which moisten it. But by displacing the liquid layer in contact with it, the currents proceed again actively. Thus the water movement in osmose is an affair of hydration and of de-hydration in the substance of the membrane, or other colloid septum; and the diffusion of the saline solution, in contact with the membrane, has little or nothing to do with the osmotic result otherwise than as it affects the state of hydration of the septum. (See also page 23.)

The researches of Professor Graham have added considerably to our knowledge of this subject, and he has classed various substances according to the degree in which they possess this property of passing, when in a state of solution in water, through membranes: those which pass freely being termed *crystalloids*, and those which pass with difficulty, *colloids*, or jelly-like.

The diffusion and circulation of medicinal substances, after they have passed through the coats of the vessels, are effected by the circulating blood, and are physical phenomena.

Although the acts by which absorption of medicine is effected may be thus regarded as physical, yet vital actions are so far necessary to the process, that they supply the conditions under which the physical phenomena are manifested. Thus, though dead tissues imbibe, and though osmosis takes place through a dead as it also does through a living membrane, yet the vital actions of the heart and lungs are necessary to keep up the circulation of the blood, by which the medicinal molecules are conveyed to distant parts, and the further imbibition and osmosis of the medicine promoted.

Action of Medicines subsequent to Absorption.—Medicinal substances, after their introduction into the blood, circulate with that liquid, traverse the capillaries of the various organs of the body, and are ultimately thrown out of the system by the excreting organs. We may first consider their action (*a*) on the blood; (*b*) on the tissues of organs; (*c*) on the excreting organs; (*d*) by nervous agency; and (*e*) the circumstances which modify their effects.

(*a*.) *On the Blood.*—A considerable number of medicinal substances, after their introduction into the circulation, produce changes in the condition of the blood; these changes may be of a physical, chemical, or vital character. The well established endosmotic effect of medicines on the blood-corpuscles is an instance of a *physical effect.* The alteration produced in the colour of the contents of the red-corpuscles by certain poisons (*e.g.* sulphuretted hydrogen and hydrocyanic acid) and chalybeates is evidence of *chemical* changes. The *vital* effects are more obscure, but there is little doubt of their existence.

There are, at least, two kinds of effects produced by medicinal and poisonous agents on the blood, which are referable to the action of these substances on the plasma. These are, an alteration in the consistence of the blood, and a change in its coagulability. For instance, the neutral salts and narcotics for the most part retard or prevent the coagulation of the blood, and lessen the quantity of fibrine obtained therefrom, whereas stimulants have an opposite effect.

(*b.*) *Action of Medicines on the Tissues of Organs.*—The specific operation of medicines, after their absorption is well known. Opium acts on the brain, strychnia on the spinal cord, &c. Attempts have been made to explain these facts on physical or chemical principles, but neither physics nor chemistry appear capable of furnishing a satisfactory explanation of the specific effects of medicines.

(*c.*) *Action of Medicines on the Excreting Organs.*—Medicines and poisonous substances, after they have been taken up and conveyed into the blood, are got rid of by the different excreting organs which expel them from the system. But the same substances are not thrown out with equal facility by all the excreting surfaces; some showing a preference for one, others for another organ. Camphor and alcohol pass out of the system by the lungs; saline and colouring substances by the kidneys, and these agents become stimulants to those respective organs.

(*d.*) *Operation of Medicines by Nervous Agency.* —A considerable number of remedial agents operate physically on the body and affect remote parts through the agency of the nervous system. The most important of these are electricity, heat, cold, light, mechanical irritants, and corrosives. They act on the principle of shock. The agents, whose operation is of the kind here referred to, affect remote parts by the agency of the cerebro-spinal and ganglionic systems. Their mode of action through the cerebro-spinal system is excitor and reflex; that is, an impression is made on, and carried by, the incident excitor or afferent nerves to the nerve-centre, which, by its peculiar power, affects a remote part through the medium of its reflex, motor, or efferent nerves.

The velocity of operation of some poisons (*e.g.* hydrocyanic acid, conia, &c.) has been thought to be incompatible with any other mode of operation than that by nervous impression. Dr. Blake has met this argument by declaring that poisons are not instantaneous in their action, but that sufficient time always elapses between the application of a poison and the first symptom of its operation, to admit of its contact with the tissue which it affects.

(*e.*) *Circumstances which Modify the Effects of*

Medicines.—These may be arranged under two heads:—(1.) Those relating to the medicine. (2.) Those relating to the organism.

(1.) Those relating to the Medicine.—The *state of aggregation* of a medicine modifies its effect—thus morphia is more active in solution than in the solid form. *Chemical combination*, as with the soluble salts of the vegetable alkaloids, which are more active than the uncombined alkaloids; and *vice versâ*, the insoluble salts are less active. Lead and baryta are rendered inert by combination with sulphuric acid. *Pharmaceutical combination* also modifies the action of medicines. This is done to promote the action of the medicines; to correct their operation, or by the joint actions of two or more medicines, to gain an effect which could not be attained by one of them.

The modifications produced in the effects of medicines by differences of dose, are well seen in the case of opium and mercurials.

(2.) Those relating to the Organism.—Under this head are included several circumstances, of which the most important are age, sex, mode of life, occupation, habit, diseased conditions of the body, climate, mind, race, temperament, idiosyncrasy, tissue, or organ.

(α.) *Age.* — The effects of medicine are modified by the age of the individual; as a general rule, it may be stated that the dose should be augmented or diminished accord-to the age of the patient.

(β.) *Sex.* — Sex has an influence on the operations of medicines. Females possess greater susceptibility of the nervous system, more excitability of the vascular system, and less energy or power, than males; and medicines act on them more rapidly, powerfully, and for a shorter period, than on males. In these respects, indeed, they simulate children. Hence, therefore, medicines should be administered in smaller doses, and at somewhat shorter intervals than to males.

During the periods of menstruation, pregnancy, and lactation, drastic purgatives should be avoided, especially during the two first conditions. Agents which may communicate injurious qualities to the blood, are also to be avoided during pregnancy and lactation.

(γ.) *Mode of Life.* — The circumstances of occupation affect the susceptibility of the whole or of different parts of the organism to the influence of external agents.

(δ.) *Habit.*—The habitual use of certain medicinal or poisonous agents, especially narcotics, lessens the influence which they would ordinarily possess over the body.

(ε.) *Diseased conditions of the Body.*— Diseases of various kinds sometimes have a remarkable influence in modifying the effects of medicines—a fact of considerable importance in practice. Two of the best known instances of this are the diminished influence of opium in tetanus, and of mercury in fever.

(ς.) *Climate.*—The well-known influence of climate in modifying the structure and functions of the animal economy, and in promoting or alleviating certain morbid conditions, necessarily induces us to ascribe to it a power of modifying the effects of medicines.

(η.) *Mind.*—The effects of medicines are very much modified by the influence of the mind. Much of the success obtained by empirical practitioners depends on the confidence that patients have in the medicines they administer.

(θ.) *Race.*—Differences of race have been supposed to give rise, in some cases, to differences in the action of medicines. On the Japanese and Malays, large doses of opium are said to cause them to become frantic and desperate.

(ι.) *Temperament.*—Temperament also modifies the influence of medicines on the system. The phlegmatic temperament is less susceptible to the influence of remedies than the choleric, the sanguine, and the melancholic. With the sanguine temperament, stimulants are to be employed very cautiously; in the nervous temperament, evacuants are to be used with great care.

(κ.) *Idiosyncrasy.* — The influence of idiosyncrasy in modifying the effects of medicines and poisons is, in general, to increase their activity. Thus some individuals are peculiarly susceptible to the action of opium, others of mercury and some of alcohol. The dust or odorous emanations of ipecacuanha, or of new-mown hay, produce in certain persons short and difficult respiration, like that of asthma, secretion from the eyes, &c.

(λ.) *Tissue or organ.*—The nature of the part to which a medicine is applied has an important influence over the effect produced. The stomach, for example, is much more susceptible to medicinal impressions than the skin. Opium acts more powerfully when applied to the serous than to the mucous membranes. Carbonic acid operates as a positive poison when inhaled, but it acts as a grateful stimulant when taken into the stomach. The modifications effected in the actions of medicines by the differences of tissue or organ depend partly on the relative rapidity and power of absorption, and partly, perhaps, on the unequal degree of decomposition which these agents undergo in different tissues.

V. THERAPEUTICAL EFFECTS OF MEDICINES.

The effects produced on diseases by the influence of medicines are denominated *therapeutical.* They are sometimes termed *secondary*, because, in a great majority of instances, they are subordinate to those already described under the name of physiological. (See page 21.)

Therapeutical effects are produced in two ways.

A. Sometimes medicines remove or destroy the exciting causes of disease when these are still acting, and are material and cognizable. They do this by either a *direct* or an *indirect* influence.

(*a.*) *Directly*, as in the case of antidotes, which render the poisons inert; and also of those agents which destroy intestinal worms, or cutaneous parasites.

(*b.*) *Indirectly*, as emetics, or purgatives, which effect a cure by removing the irritating matter.

B. In a large majority of instances, however, the causes of disease have ceased to act; or, if still acting, are either not cognizable, or, if cognizable, are not of a material nature. In all such cases medicines are administered to alter diseased action. The agents employed for this purpose operate either *directly* or *indirectly*.

(a.) Directly when their particles come in contact with the diseased part, either by immediate application to it, as in the case of ointments, lotions, gargles, injections, or other topical agents; or by absorption, and through the medium of the circulation, as when turpentines are employed in gleet and leucorrhœa.

(*b.*) *Indirectly* when their influence is exerted directly on some other part, and through this indirectly on the seat of the disease. The beneficial effects of purgatives in cutaneous and cerebral diseases, of diuretics in dropsies, of opium in allaying spasm of the intestinal canal, or in checking diarrhœa, and of blisters in intestinal diseases generally, are obtained in this way.

In all these cases the therapeutic effect is explained by assuming that a new kind of action is set up in the part affected, by which the previous morbid action is superseded; and that the new action, or artificial disease, subsides when the use of the medicine is suspended or desisted from.

METHODS OF TREATMENT.—There are supposed to be only three relations between the symptoms of disease and the specific effects of remedies, namely—*opposition*, *resemblance*, and *heterogeneity;* and, consequently, only three methods of employing medicines against disease. These are denominated *antipathic*, *homœopathic*, and *allopathic*.

A. The *Antipathic* method consists in employing medicines which produce effects of an opposite nature to the symptoms of the disease, as when purgatives are employed to relieve constipation; depletion is used to counteract plethora, or cold to alleviate the effects of scalds, &c.

B. The *Homœopathic* method consists in administering a medicine capable of producing effects similar to the disease to be removed, and the axiom adopted is "*similia similibus curantur*."

C. The *Allopathic* method consists in the employment of medicines which give rise to phenomena altogether different or foreign (neither similar nor exactly opposite) to those of the disease.

VI. PARTS TO WHICH MEDICINES ARE APPLIED.

Medicines are applied to the (A) Skin; to

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the (B) Mucous Membranes; to the (C) Serous Membranes; to (D) Ulcers, Wounds, and Abscesses; or they are (E) Injected into the Veins.

A. **Applications to the Skin.**—Medicinal applications are frequently made to the skin in order to produce local effects, and occasionally to affect remote parts, as when we so use mercury. In these latter cases the medicines act in consequence of their absorption; and as the cuticle offers mechanical impediments to this process, it is usual to remove it, or make use of friction.

There are four methods of applying medicines to the skin—the (*a*) En-epidermic, the (*b*) Epidermic, the (*c*) En-dermic, and the (*d*) Hypo-dermic.

(*a.*) *En-epidermic* method consists in the application of medicines to the skin, unassisted by friction; as with plasters, blisters, poultices, lotions, baths, &c.

(*b.*) *Epidermic* or iatraleptic method consists in the application of medicines to the skin, aided by friction; as in the employment of embrocations, liniments, ointments, &c. They consist of both soluble and insoluble substances, dissolved or suspended in water, spirit, oil, or fatty matter.

(*c.*) *En-dermic* or emplastro-endermic method consists in the application of medicinal agents to the denuded dermis. (The denuded surface is generally effected by a blistering plaster. When the cuticle is elevated, an opening is to be made into it, in order to allow the serum to escape; and the cuticle may or may not be removed.) The medicine is applied either in its pure state, in the form of an impalpable powder, or, if too irritating, it is to be incorporated with gelatine, lard, glycerine, vaseline, &c.

Should any circumstance lead to the fear that the quantity of medicine applied has been too great, the mode of proceeding is the following:—Cleanse the surface immediately; make compression (as by a cupping-glass) around the denuded part, in order to prevent absorption, and apply any substance that will neutralize the effect of the medicine. Acetate of morphia will destroy the tetanic symptoms caused by strychnia. Musk and camphor are said to counteract the narcotism of morphia.

(*d.*) *Hypo-dermic* method consists in introducing medicines into the system by means of subcutaneous injection.

The best mode of making the injection is to pick up a fold of loose skin, and push the canula (syringe) right through till its point works loosely in the subdermic tissue; then inject slowly. After the withdrawal of the canula, press firmly with the finger on the tract, keeping it applied to the puncture for a minute or two.

The medicines to be so used should be in solution, and perfectly clear, neither acid nor alkaline, but as nearly neutral as possible—no irritant medicine should be so administered. The chief physiological and therapeutical effects of nearly every medicinal substance are the same, when it is hypodermically administered as when swallowed. But it is more rapid and certain in its action by the hypo-dermic method.

B. **Applications to the Mucous Membranes.**—These membranes are described as lining certain tracts—the *(a)* Digestive, the *(b)* Respiratory, and the *(c)* Genito-urinary.

(a.) The Digestive Tract commences in the cavity of the mouth, passing into the ducts of the salivary glands; from the mouth it passes through the fauces, pharynx, œsophagus, stomach, and intestinal canal to the termination of the rectum.

Medicines are employed at both extremities of the digestive or alimentary canal, at the upper part, however, more frequently than at the lower. This mode of employing medicines is called the method of ingestion. Of all parts of the body, the gastro-intestinal surface is the most useful for the application of medicines. This arises from the great susceptibility, the active absorbing power (see page 28), and the numerous relations which the stomach has with almost every part of the body. In many cases remote effects are more readily produced by this than by any other organ, as in the case of diffusible stimulants.

(b.) The Respiratory Tract includes the mucous membrane lining the cavity of the nose, and the various sinuses communicating with it, the lachrymal canal and sac, the conjunctiva of the eye and eyelids, and the prolongation which passes along the Eustachian tube and

lines the tympanum and inner surface of the membrana tympani. Crossing the pharynx, and lining that part of it which is above the soft palate, the respiratory tract leads into the glottis, through larynx and trachea, to the bronchi and their divisions.

Medicines are applied to this tract by inhalation, and observation has shown that they often produce very powerful effects; applications to these parts are in general made use of for local purposes, as in asthma, chronic bronchitis, phthisis, &c. Some advocate the inhalation of solid substances reduced to an impalpable powder, in pulmonary diseases. The fumes of tar, balsams, resins, and other burning bodies, have also been employed in these cases. The inhalation of aqueous vapour, either alone or with other substances, is oftentimes useful in various affections of the lungs and of the throat, &c. Medicines are applied to the conjunctiva to excite local effects only, though remote effects might be produced thereby. Medicines are sometimes applied to the nasal tract to excite a discharge or sneezing, &c., and are called *errhines* or *sternutatories.* Medicines applied to the mucous membrane of the mouth and throat are usually in the form of lozenges, linctuses, and gargles; lotions are sometimes applied to the lining membrane of the Eustachian tube.

(c.) The Genito-Urinary Tract lines the whole of the genital and urinary passages. Medicines are applied to the lining membranes of the urethra, vagina, and uterus to

produce local effects only. They are used either in a solid form, as caustics or medicated bougies; or in a liquid form, as an injection.

C. **Applications to the Serous Membranes.** — These membranes line cavities which do not have external openings, and are the arachnoid, pericardium, pluræ, peritoneum, and tunica vaginales; and also the synovial membranes lining the joints, the sheaths of tendons and ligaments.

Injections, such as wine and water, solutions of metallic salts, &c., are thrown into the cavity of the serous membrane of the testicle in hydrocele, in order to excite inflammation, and the subsequent adhesion of the sides of the sac. Injections have also been introduced into the peritoneal sac, but the practice is very dangerous.

Medicines which act by absorption are more energetic when applied to the serous membranes.

D.—**Applications to Ulcers, Wounds, and Abscesses.**—These are applied principally to excite local effects; and sometimes, though rarely, to produce constitutional effects, such as the application of corrosive sublimate to wounds, with the view of causing salivation.

E. **Injection of Medicines into the Veins.**—The history of this operation is inseparably connected with that of *transfusion.* The effects are of the same general nature as when medicines are applied to the skin or to the stomach. The practice is attended with some danger, and should not be resorted to except in extreme cases.

VII. THE CLASSIFICATION OF MEDICINES.

Our uncertain knowledge of the action of medicines renders any classification adopted imperfect; some have given preference to a chemical, others to a natural-historical, a physiological, or a therapeutical classification.

The authors, considering the special object which they have in view, are of opinion that the following classification is the one best suited to the purposes of this work, namely—

Alteratives (Deobstruents, Liquefacients).
Anæsthetics.
Anodynes.
Antacids.
Antemetics.
Anthidrotics.
Antiperiodics.
Antiseptics. (Disinfectants, Deodorisers).
Antispasmodics.
Astringents. (Styptics, Constringents, Hæmostatics).
Carminatives.
Cathartics. (Purgatives, Evacuents, Laxatives)
Caustics. (Cauterants, Escharotics).
Counter-irritants. (Revulsions).
Demulcents.
Desiccants. (Absorbents).
Detergents.
Diaphoritics. (Sudorifics).
Diluents.
Discutients.

Emetics. (Vomits).
Emolients.
Errhines
Expectorants.
Hæmatinics. (Anti-anæmics).
Irritants. (Rubefacients).
Narcotics. (Hypnotics, Soporifics).
Neurotics. (Nervines).
Nutritives.
Refrigerants. (Febrifuges).
Resolvents.
Sedatives. (Contra-Stimulants, Calmatives, Depressants).
Sialogogues.
Spinants.
Stimulants. (Excitants, Hypersthenics).
Tonics. (Corroborants, Restoratives).
Vesicants.

ABSORBENTS (see Desiccants).

ALTERATIVES **(Deobstruents, Liquefacients).** Medicines which, acting obscurely or specifically, alter morbid conditions of the system, causing changes in the glandular, capillary, and other systems, and thereby accelerating the metamorphosis of tissue, and promoting the removal of swellings, fluid or solid.

Liq. Arsenicalis.—Colchicum.—Hydrargyri Oxidum Rubrum—Hydrargyri Perchloridum—Hydrargyri Subchloridum—Hydrargyrum cum Cretâ—Iodum—Oleum Morrhuæ—Podophylli Resina—Potassii Bromidum—Potassæ Chloras—Potassii Iodidum.

ANÆSTHETICS.—Agents which diminish sensibility, or relieve pain. They are GENERAL and LOCAL. The former term is commonly applied to vapours or gases which, when inhaled, act upon the nerve centres and temporarily suspend the common or general sensibility of the body. Local anæsthetics are those substances which produce loss of sensation by direct action on the sensory nerves of the skin or mucous membrane, to which they are applied. All such substances are thereby fitted for preventing pain during surgical operations.

GENERAL.—*Amyl Nitris—Bromide of Ethyl — Chloroformum — Æther — Ethidene-dichloridum — Methylene Bichloridum—Nitrosum Oxidum.*

Ethylene

LOCAL. — *Cold*, by means of ice, evaporation of æther, &c.—*Aconitum,—Acidum Carbolicum—Potassii Bromidum — Chloroformum — Camphora — Chloramyl.*

ANODYNES.—Medicines which alleviate pain. *Aconitum—Amyl Nitris—Belladonna —Camphora—Cannabis Indica—Croton Chloral—Gelseminum — Hyoscyamus—Morphia—Opium—Acidum Carbolicum — Stramonium — Chloroformum — Æther.*

ANTACIDS.—Agents which correct acidity by combining chemically with any free acid existing in the stomach, intestines, or elsewhere. They render the blood and secretions more fluid.

Ammonia—A. Carbonas—A. Acetas—Aqua Calcis—Calcis Carbonas—Creta Præparata — Magnesia — M. Carbonas—Liq. Potassæ—Pot. Bicarbonas—P. Carbonas—Sapo Durus—Sodæ Bicarbonas—S. Carbonas—Spiritus Ammoniæ Aromat.

ANTEMETICS.—Medicines which arrest vomiting arising from disease or sea sickness.

Acidum Hydrocyanicum Dil.—Acid. Nitricum Dil.—Acid. Phosph. Dil.—Belladonna—Bismuthi Subnit.—Aqua Calcis—Cerii Oxalis—Chloral—Chloroformum—Creasotum—Magnesia.

ANTHIDROTICS.—Medicines which check perspiration.

Acidum Aceticum—Acid. Sulphuricum Dil. — Acid. Tannicum — Ferri. Sulphas — Mist. Ferri Comp.—Decoct. Hæmatoxyli—Zinci Oxidum.

ANTIPERIODICS.—Medicines which have the property of interrupting periodical attacks of disease.

Chloroformum--Ext. Cinchonæ Liquid.—Liq. Arsenicalis — Sodii Chloridum—Quiniæ Sulphas.

ANTISEPTICS. (Disinfectants.)—Agents which prevent the decomposition of organic substances, and destroy infection and fœtid odours.

Acidum Carbolicum—A. Hydrochloricum — A. Nitricum—A. Salicylicum

— A. Sulphurosum — Calx Chlorata— Carbo Ligni — Creasotum — Potassæ Permanganas—Liquor Sodæ Chloratæ —Thymol—Zinci Chloridum—Ol. Eucalypti—Liquor Chlori—Sodæ Phænas —Sanitas—Iodoformum—Menthol.

ANTISPASMODICS.—Medicines which allay irregular and inordinate muscular contraction, and prevent the recurrence of spasms.

Æther— Ammonia — Ammon. Carbonas—Spiritus Ammon. Aromaticus— Argenti Nitras — Belladonna—Oleum Cajuputi — Calendula — Camphora — Cannabis Indica — Chloral-hydras — Chloroformum — Hyoscyamus — Assafœtida—Spiritus Ammoniæ Fœtidus— Stramonium — Valeriana and Valerianates.

ASTRINGENTS (Styptics, Constringents.) — Medicines which produce contraction of the tissues, and coagulation of the albuminous fluids; they are given to improve digestion and check increased secretions and mucous discharges, and to stop hæmorrhage (hæmostatics). Or applied topically to obviate relaxation, and to stop bleeding.

Acidum Carbolicum—A. Gallicum— A. Sulphuricum—A. Tannicum—Alumen — Bismuthi Subnitras—Borax— Catechu—Creasotum—Ferri Sulphas— Tinct. Ferri Perchlor.— Liquor Ferri Pernitratis — Galla — Krameria —

Matico—Plumbi Acetas—Plumbi Carbonas—Liquor Plumbi Subacetas Dil. —Zinci Carbonas — Zinci Oxidum—Zinci Sulphas.

CARMINATIVES.—Remedies which dispel flatulence, and allay pain of the stomach and bowels.

Cardamoms—Ol. Carui — Caryophyllum — Cinnamomum — Coriandrum—Juniperus--Lavandula--Ol. Menthæ Pip. —Zingiber.

CATHARTICS (Purgatives, Evacuants, Laxatives.) — Medicines which promote alvine evacuations. These are termed *laxative*, when mild, *purgative*, when active, and *drastic*, when very violent. They vary in their mode of action, some rouse and increase the peristaltic action, others merely stimulate the mucous glands, producing watery evacuations. Further, these medicines elect certain parts of the bowels on which to operate. Jalap acts on the small intestines chiefly; aloes and colocynth on the large bowels, while rhubarb acts on both.

MILD OR LAXATIVE.—*Ficus — Pulv. Glycrrhizæ Co. — Ipecacuanha — Magnesia—M. Carbonas—Manna— Mel—Oleum Ricini—Sapo —Sulphur —Taraxacum.*

ACTIVELY APERIENT OR PURGATIVE.—*Aloes—Colchicum—Jalapa—Magnesiæ Sulphas — Podophyllin — Rheum — Senna.*

DRASTIC, OR HYDRAGOGUE. — *Colocynthis— Oleum Crotonis — Gambogia — Hydrargyri Subchloridum — Scammonium.*

MINERAL WATERS.—*Carlsbad—Friedrichshall — Pullna — Seidlitz — Hunyardi.*

CAUSTICS (Cauterants, Escharotics.)—Substances possessing the power of destroying living tissue. When they act powerfully, they produce an eschar—hence escharotics.

Arseniosum Oxidum—Acid. Carbolicum — Acid. Hydrochloricum — Acid. Nitricum — Acid. Sulphuricum—Ammoniæ Liq. Fort.—Ammonii Chloridum—Argenti Nitras—Calx— Creasotum—Cupri Sulphas—Hydragyri Perchloridum—Linimentum Iodi—Potassa cum Calce — Potassæ Permanganas — Soda Caustica—Zinci Chloridum.

COUNTER-IRRITANTS (Revulsions.)— An irritant applied to one part to relieve diseased action in another part (see Irritants).

DEMULCENTS.—Internal emollients which soothe and soften the parts with which they come in contact. They are useful in dry, irritable, or inflamed conditions of the mucous membranes of the eye nose, mouth, fauces, gullet, stomach intestines, especially the rectum, and the genito-urinary passages.

Mucilago Acaciæ — Amylum — Cetraria — Glycerinum — Glycyrrhiza —

Hordeum — Lini Semen — Mel — Oleum Morrhuæ — Oleum Olivæ — Tragacantha.

DEOBSTRUENTS.—(See Alteratives.)

DEPRESSANTS.—(See Sedatives).

DESICCANTS (Absorbents.) — Agents which check secretion, and dry up discharges from ulcers and wounds.

Acidum Tannicum — Amylum — Bismuthi Subnitras — Armenian Bole — Calcis Carbonas — Carbo — Pulvis Gallæ Magnesia — Pulvis Myrrhæ — Zinci Oxidum.

DETERGENTS.—Substances which cleanse wounds, ulcers, &c., as stimulants, or emollients (which see.)

DIAPHORETICS (Sudorifics.)— Medicines which increase the exhalation of the skin and produce sweating. Employed in fresh colds, in fevers, dropsy, and some skin diseases.

Liq. Ammoniæ Acet. — Ammoniæ Carbonas — Ammonii Chloridum — Ammoniæ Citras — Vinum Antimonii — Belladonna — Calendula — Camphora — Pulvis Doveri — Ipecacuanha — Jaborandi — Potassæ Citras — Potassæ Nitras — Sp. Ætheris Nitrosi — Vinum Colchici.

DILUENTS.—Watery solutions which dilute the blood, and thus increase its fluidity; they also exercise a solvent action, and, in their passage through the blood, carry with them some portions of its solid constituents, and thus exercise an eliminative action.

Aërated Waters—Barley Water—Thin gruel—The Mineral Waters—Rice water—Water—Weak Beef Tea—Whey.

DISCUTIENTS.—Medicines which disperse or repel morbid swellings, as do alteratives, q.v.

DISINFECTANTS (see Antiseptics).

EMETICS (Vomits.) — Medicines which excite vomiting.

Alum (in repeated doses)—*Anthemis—Antimonium Tartaratum—Cupri Sulphas—Ipecacuanha—Sinapis Pulvis—Sodii Chloridum—Zinci Sulphas.*

EMOLIENTS.—Substances which relax the solid tissues, protect sensitive surfaces, allay irritation, and the pain in ulceration of the mucous membranes of the alimentary canal, &c.

Acacia—Adeps—Cera—Cetaceum—Collodion—Decoctum Hordei—Decoctum Lini—Glycerinum—Glycerinum Amyli—Tragacantha.

ERRHINES.—Substances which induce a secretion from the nose without sneezing.

Ammonia—Acidum Aceticum—Chlorine fumes—Radix Iridis—Ipecacuanha—various kinds of snuff.

ESCHAROTICS (See Caustics).—Substances which form an Eschar, or slough.

EXPECTORANTS.—Medicines which promote the secretion of bronchial mucus.

Acidum Benzoicum—Ammonia—

Ammon. Carbonas — Ammonii Chloridum — Antimonium Tartaratum — Æther—Balsamum Tolutanum—Galbanum—Ipecacuanha—Myrrha—Scilla.

FEBRIFUGES (See Refrigerants).

HÆMATINICS (Anti-anæmics).—Medicines which augment the number of red corpuscles.

Ferri et Ammoniæ Citras — Ferri Carbonas Saccharata — Syr. Ferri. Phos. Co. (Parrish)—Ferrum Redactum—Tinct. Ferri Perchlor.—F. Sulph. —Liq. F. Dialysatus.

HÆMOSTATICS (see Astringents). — Substances which arrest hæmorrhage.

HYPNOTICS (see Narcotics).—Medicines which cause sleep.

IRRITANTS (**Rubefacients.**)—Substances that stimulate and cause irritation or inflammation of the parts to which they are applied.

Acidum Aceticum Glaciale—Acetum Cantharidis—Ammonia—Iodum—Lin. Camphoræ Co.—Lin. Crotonis—Sinapis —Terebinthina.

LAXATIVES (See Cathartics).

NARCOTICS (**Hypnotics, Soporifics.**)—Medicines which cause stupor or sleep, allay pain, arrest inordinate secretions, and subdue irritation.

Amyl Nitris — Belladonna—Chloral Hydras—Croton-Chloral— Hyoscyamus Morphia — Opium — Chloroformum — Æther.

NERVINES (See Neurotics).

NEUROTICS (Nervines.)—Medicines that have the power of relieving or curing disorders of the nerves.

Aconitum — Ammonia — Ammon. Valerianas— Assafœtida — Belladonna —Camphora—Chloroformum—Gelseminum — Liq. Arsenicalis — Moschus— Oxygen—Phosphorus—Potassii Bromidum—Strychnia—Zinci Valerianas.

NUTRITIVES.— Substances which quicken assimilation, and improve the composition of living tissues.

Extractum Carnis—Ficus—Glycerinum—Gum. Acaciæ—Lac—Manna — Oleum Morrhuæ—Ovi Vitellus.

PURGATIVES (See Cathartics).

REFRIGERANTS (Febrifuges.) — Medicines which diminish heat and quench thirst.

Acidum Aceticum Dil.—Acid. Citricum—Acid. Hydrochloricum Dil.—Acid. Nitricum Dil. — Acid. Tartaricum — Acid Phosphoricum Dil.—Acid. Sulphuricum Dil.—Liquor Ammoniæ Acet. —Aurantii Succus—Limonis Succus— Potassæ Citras — Potassæ Chloras — Potassæ Nitras—Potassæ Tart. Acida — Spt. Ætheris Nitrosi.

RESOLVENTS.—Medicines which allay inflammation and disperse morbid swellings, as Alteratives and Emollients.

RESTORATIVES (see Stimulants and Tonics).

RUBEFACIENTS (see Irritants).—Agents which, when applied to the skin, irritate and redden it.

SEDATIVES **(Contra-stimulants, Calmatives, Depressants.)**— Medicines which directly depress the vital powers, there being no antecedent excitement. In large doses they give rise to delirium, whereas in the case of narcotics the tendency is to apoplexy and coma.

Acidum Hydrocyanicum Dil.—Aconitum—Antimonium Tartaratum—Chloroformum — Conium — Creasotum — Digitalis—Lobelia—Tabacum— Potassii Bromidum.

SIALOGOGUES.— Substances which excite the secretion of saliva by a topical, irritant, or stimulant action.

Armoracia — Caryophyllum —Mezereon— Radix Pyrethri—Senega—Zingiber—Jaborandi.

SOPORIFICS (see Narcotics).

SPINANTS. — Medicines which act upon the spinal cord.

Strichnia—Cantharadies — Phosphorous—Arnica — Opium — Morphia — Belladonna — Canabis Indica—Gelseminum —Potassii Bromidum—Ammonii Bromidum.

STIMULANTS **(Excitants, Hypersthenics.)** — Remedies which excite the vital powers, and give an impulse to the circulation, by increasing the force and frequency of the heart's contractions. The most important are marked thus*.

**Æther — *Ammoniacum — *Ammoniæ Carbonas—Liquor Ammoniæ—*

**Spirit Ammoniæ Aromat.—Anethum—Armoracia—Arnica—*Camphora—Caryophyllum—*Liquor Chlori—Zingiber—The Labiate Essential Oils, and Alcoholic Drinks.*

STYPTICS (see Astringents).

SUDORIFICS (see Diaphoretics).

TONICS (Corroborants, Restoratives.) — Medicines which impart firmness, vigour, and tone to the body when it is relaxed and debilitated. They are stimulants, inasmuch as they quicken the vital powers; but this result is brought about gradually, and is of a more or less lasting nature. Some act upon the nervous system only, others on the vascular.

Acid. Hydrochlor. Dil.—Acid. Nitric. Dil.—Acid. Phosph. Dil.—Acid. Sulph. Dil.—Anthemis—Argenti Nitras—Argenti Oxidum—Bismuthi Sub-nit.—Berberiæ Sulphas.

Calumbæ Radix—Cascarilla—Cinchona—Ferri Carb. Sacch.—Ferri et Ammon. Cit.—Ferri et Quin. Cit.—Ferri Iodidum—Ferri Perchlor.—Ferri Peroxid. Hydrat.—Syrup. Ferri Phosph. Co. (Parrish)—Ferri Sulph.—Ferrum Redact.—Ferri Tart.—Gentiana—Oleum Morrhuæ—Nux Vomica—Quassia—Quiniæ Sulphas—Scutellarin—Taraxacum—Zinci Oxidum—Zinci Sulphas.

VESICANTS.—Topical agents which cause the exudation of a thin serous fluid under the cuticle.

Acid. Aceticum Glac.—Ammoniæ Liq. Fort.—Cantharis—Sinapis.

ADMINISTRATION OF MEDICINE.

The Actions of Medicines are modified according to the form of administration and time of exhibition.

The effects of medicines vary very considerably according to the form in which they are given, and the condition of the stomach when so administered. If food be present in the stomach, the current is from the blood vessels into the cavity of that organ, in which case the action would be much slower. When the effects of medicines are intended to be immediate, they should be administered in the form of solution, and upon an empty stomach, rather than in a solid form and full state of stomach.

1. In cases where we seek to allay irritation of the stomach, or give tone to that organ, the medicine should be taken from half an hour to an hour, or more, before food.

2. Alkaline medicines should be taken an hour before, or three or four hours after meals.

3. Medicines taken with a view to their absorption, and thereby the improvement of the state of the blood, or general nutrition of the body, are, perhaps, best administered

either at the time of meals or soon after. Iron taken at such periods appears to be absorbed into the blood with the chyle, and is therefore present during the production of the blood cells, the formation of which it probably aids.

4. Medicines which are apt to irritate the stomach should be taken soon after food.

5. If a drug be given to promote sleep, the time of its administration must vary according to the form of the medicine, the peculiarity of the medicine itself, and the idiosyncrasy of the patient. If in the form of pill, it should be given at a much longer period before the soporific effect is desired, than when in solution ; and again, some patients are more quickly brought under the influence of narcotics than others. By the continued use of certain medicines their action is modified, and also the time required for the production of their effects.

6. Purgatives are usually intended to act on the lower portions of the alimentary canal, and not on the stomach ; therefore they should be given either half an hour or so before a meal (when their effect is more marked), or, at least, four hours afterwards.

In cases of anthelmintics, the patient should fast many hours before taking them.

FORMS OF MEDICINES.

Alkaloids Are the active principles of drugs.

Cataplasms Are soft pultaceous preparations for external use, and made extemporaneously.

Confections Are preparations of the consistence of honey, composed of dry powders mixed with honey, sugar, syrup, mucilage, or glycerine.

Decoctions Are solutions of the active parts of vegetables obtained by boiling in water.

Emulsions Are preparations in which substances sparingly soluble in water, such as oils, resins, &c., are suspended by means of mucilage, sugar, yolk of egg, &c.

Enemata Are liquid preparations for injection by the rectum.

Extracts Are preparations prepared by evaporating the juices, infusions, or decoctions of vegetables to the consistence of an electuary, or a less fluid condition.

Infusions Are aqueous solutions of vegetable substances made by maceration either in hot or cold water.

Injections Are liquid preparations for injection into, generally, the urethral and vaginal cavities.

Liniments and Embrocations Are liquid preparations for external use, compounded of strong drugs.

Lotions Are liquid preparations intended for external use, and include fomentations, collyria, gargles, &c.

Mixtures Are liquid preparations of various combinations administered by the mouth.

Ointments (Cerates) Are preparations for local use, of the consistence of butter, being combinations of lard, wax, or resin, with solid or liquid ingredients.

Pills Are masses of various ingredients of a consistence to retain a globular form.

Plasters Are combinations of wax, resin, fats soap, &c., with more active ingredients and of a firmer consistence than ointments, used as applications to the surface of the body.

Syrups Are watery infusions, &c., combined with sugar.

Tinctures Are solutions of the active constituents of drugs and chemicals in rectified or proof spirits.

CHEMICAL NOTATION.

Prior to the discovery of Oxygen gas, chemical bodies were distinguished from each other by arbitrary names such as Aqua Fortis, Oil of Vitriol, Spirits of Salt, Glaubers Salt, Corrosive Sublimate, &c., &c.

On the discovery of Oxygen by Priestley in England, in 1774, and that of Chlorine by Scheele in Sweden, in the same year, followed by the subsequent discoveries of other elementary bodies, a field of enquiry was opened as to the constitution of the different chemical compounds termed *salts.*

OLD THEORY.

Under this theory two distinct kinds of acids were supposed to exist, *Hydr-acids* and *Oxy-acids*; the Hydr-acid being composed of Hydrogen with an elementary Radical as in *Hydrochloric Acid* (H Cl)—the Oxy-acid considered as a compound of the anhydrous acid with water, as in Sulphuric Acid ($HO\ SO_3$)

When a *Hydr-acid* was brought into contact with a metallic Oxide the result was the formation of a *Haloid* salt (from ἁλς, *als*, sea salt; and ειδος, *eidos*, likeness), so called from its resembling sea salt or chloride of sodium in composition. Thus *$NaO + HCl = Na\ Cl + HO$.

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* Old Notation.

When an *Oxy-acid* was treated in a similar manner, the change that ensued was considered to be the production of an *Oxysalt* and water. Thus—

$$^{*}NaO + HOSO_3 = NaOSO_3 + HO.$$

The Haloid salt, therefore, was composed of two elementary bodies directly united, and the Oxysalt was looked upon as a combination of the oxide of a metal with an anhydrous acid, the water of the acid being displaced by the metal.

NEW THEORY.

Sir Humphrey Davy, observing the close analogy between the reaction of chlorides on the one hand, and of oxysalts, such as sulphates, nitrates, &c., on the other, suggested that the latter might be regarded like the former—as compounds of metals with acid or electro negative radicals, the only difference being that in the former the acid radical is an *elementary body*, as Cl. Br. I., &c., whereas in the latter it is a *compound*, as †$\mathbf{SO_4}$. $\mathbf{NO_3}$. $\mathbf{PO_4}$., &c. This was called "*the Binary theory*" of salts, and was supported by several contemporary chemists, and subsequently by Liebig, Daniel, Miller, and others; and, with certain modifications, is now generally adopted.

A similar view is taken in reference to the *acids* which were formerly looked upon as compounds of Anhydrous acid with water, and are now generally regarded as "salts of Hydrogen." Thus—

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* Old Notation. † New Notation.

Old Theory and Notation.	**New Theory and Notation.**
Sulphuric Acid $HO\ SO_3$	H_2SO_4
Nitric Acid $HO\ NO_5$	$H\ NO_3$
Hydrochloric $H\ Cl$	$H\ Cl$
Acetic Acid $HO\ C_4H_3O_3$	$H\ C_2H_3O_2$

According to the new theory, then, when any of these acids are brought into contact with metallic oxides the result is the formation of a Binary salt and water. Thus—

$$Na_2O + 2\ H\ Cl = 2\ Na\ Cl + H_2O$$
$$Na_2O + 2\ H\ NO_3 = 2\ Na\ NO_3 + H_2O$$

ATOMS.

An atom is the smallest portion of matter that can exist in a *combined state*, and this chemical atom is always represented by the symbol of the element; thus H represents an atom of Hydrogen, O an atom of Oxygen, N an atom of Nitrogen, &c.

The weight of an atom is the *atomic weight*. A table with the symbols and atomic weights will be found on page 70, and it should be observed that *three non-metallic* and *fifteen metallic* elements have their atomic weights doubled according to the New Notation—Oxygen, whose atomic weight was formerly 8, for instance, is now 16.

MOLECULES.

A molecule is the smallest portion of any body, simple or compound, that is *capable of existing in a free state.* Thus a molecule of Hydrogen will be composed of two atoms HH or H_2, of Oxygen OO or O_2, &c.; a molecule of Hydrochloric acid, of one atom of Hydrogen and one atom of Chlorine (H Cl); a molecule of Sulphuric acid of two atoms of Hydrogen and one atom of Sulphuric Radical (H_2SO_4). The weight of a molecule is termed its *molecular weight*, which can be readily ascertained by the addition of the weights of the atoms composing it.

QUANTIVALENCE.

This signifies the *capacity for saturation* which a body possesses (from *Quantitas*, quantity; and *Valens* being worth). Hydrogen is adopted as the unit, and is univalent (from *Unus* one, and *Valens*). The degree of quantivalence is expressed by dashes or figures placed above the symbols, the latter being more convenient for the larger numbers.

Exs. H' Cl' Hg'' Bi''' $Pt^{iv.}$ $As^{v.}$ $Co^{vi.}$

The following are the principal bodies referred to in this work, arranged according to their respective quantivalence :—

UNIVALENTS, sometimes termed MONADS.

ACIDULOUS RADICALS.	ACIDS.	BASYLOUS RADICALS.
	Combinations of Acidulous Radicals with Hydrogen.	
		Hydrogen H
Chlorine Cl'	Hydrochloric $H'\,Cl'$	
Bromine Br'	Hydrobromic $H'Br'$	Potassium K'
Iodine I'	Hydriodic $H'I'$	Sodium Na'
Hydroxyl HO'		Ammonium NH'_4
Nitric NO'_3	Nitric $H'NO'_3$	Silver Ag'
Nitrous, NO'_2	Nitrous $H'\,NO'_2$	Mercury Hg' (ous)
Chloric $Cl\,O'_3$	Chloric $H'ClO'_3$	Ethyl $C_2H'_5$
Hypochlorous ClO'	Hypochlorous $H'ClO'$	Butyl $C_4H'_9$
Acetic $C_2H_3O'_2$	Acetic $H'C_2H_3O'_2$	Amyl $C_5H'_{11}$
Hypophosphorous $PH\ O'_2$	Hypophosphorous $H'PH_2O'_2$	
Phenic $C_6H_5\,O'$	Phenic or Carbolic $H'C_6H_5O'$	
Valerianic $C_5H_9O'_2$	Valerianic $H'C_5H_9O'_2$	

NOTE.—Hydrogen acts both as an Acidulous and Basylous Radical.
Nitrogen is Univalent in Nitrous Oxide N'_2O''

BIVALENTS, sometimes termed DYADS.

These are Bivalent in relation to Hydrogen or other Monads, an atom of any one will displace two atoms of a Monad, or combine with the same number.

ACIDULOUS RADICALS.	ACIDS.	BASYLOUS RADICALS.
Oxygen O''		**Calcium Ca''**
Sulphur S''		**Magnesium Mg''**
Sulphuric SO''_4	**Sulphuric $H'_2\,SO''_4$**	**Zinc Zn''**
Sulphurous SO''_3	**Sulphurous $H'_2\,SO''_3$**	**Copper Cu''**
Hyposulphurous $S_2\,O''_3$	**Hyposulphurous $H'_2\,S_2\,O''_3$**	**Lead Pb''**
Chromic CrO''^4	**Chromic $H'_2\,CrO''_4$**	**Mercury Hg'' (ic)**
Permanganic $Mn_2\,O''_8$	**Permanganic $H'_2\,Mn_2\,O''_8$**	**Iron Fe'' (ous)**
Tartaric $C_4\,H_4\,O''_6$	**Tartaric $H'_2\,C_4\,H_4\,O''_6$**	**Manganese Mn''**
		Cobalt Co''

In this work Manganese and Cobalt are Bivalent.

TRIVALENTS, sometimes termed TRIADS.

An atom of any one of these will displace three atoms of a Monad, or combine with the same number.

ACIDULOUS RADICALS.	ACIDS.	BASYLOUS RADICALS.
Phosphoric PO'''^{4}	**Phosphoric $H'_3\ PO'''_4$**	**Nitrogen N'''**
Boracic BO'''_3	**Boracic $H'_3\ BO'''_3$**	**Phosphorus P'''**
Arsenious AsO'''_3	**Arsenious $H'_3\ AsO'''_3$**	**Boron B'''**
Arsenic AsO'''_4	**Arsenic $H'_3\ AsO'''_4$**	**Aluminium Al'''**
Citric $C_6\ H_5\ O'''_7$	**Citric $H'_3\ C_6\ H_5\ O'''_7$**	**Antimony Sb'''**
		Bismuth Bi'''
		Iron Fe'''_2 (ic)
		Glyceryl $C_3\ H'''_5$

In this work Nitrogen is Trivalent in Ammoniacal Gas NH'''_3.

QUADRIVALENTS, sometimes termed TETRADS.

An atom of each of these will displace four atoms of a Monad, or combine with the same number.

		BASYLOUS RADICAL.
		Carbon $C^{iv.}$
		Lead $Pb^{iv.}$
		Platinum $Pt^{iv.}$

In this work Lead is Bivalent only, and will be found arranged under that head.

Some regard Aluminium, Iron, Cobalt and Manganese as Members of this group.

QUINQUIVALENTS, sometimes termed PENTADS.

		BASYLOUS RADICALS.
		Nitrogen $N^{v\cdot}$
		Phosphorous $P^{v\cdot}$
		Antimony $Sb^{v\cdot}$
		Arsenic $As^{v\cdot}$
		Bismuth $Bi^{v\cdot}$

In this work these exert Trivalent capacities of Saturation, and are placed under that head. In the Ammoniacal Salts Nitrogen has a Quinquivalent capacity, as in Ammonii Chloridum $N^{v\cdot}H'_4Cl'$., and an Univalent one in N'_2O'' as before stated.

SEXIVALENTS, sometimes termed HEXADS.

ACIDULOUS RADICAL.		BASYLOUS RADICALS.
Sulphur $S^{vj\cdot}$		**Cobalt $Co^{vj\cdot}$**
		Iron $Fe^{vj\cdot}$
		Chromium $Cr^{vj\cdot}$

In this work Sulphur is Bivalent only, except in Sulphurious Oxide $S^{iv\cdot}\,O''_2$ where it is Quadrivalent. Iron is Bivalent in the "ous" or lower state, and Trivalent in the "ic" or higher state, and Cobalt in combination is Bivalent.

ELEMENTARY BODIES.

Table of the Names, Symbols, and Atomic Weights of the principal Elements.

NOTE.—The names of the more important elements are distinguished by the larger and more conspicuous type; the *metalloids* being indicated by an asterisk.

ELEMENTS.	SYMBOLS & ATOMIC WEIGHTS.	
	Old Notation.	*New Notation.*
ALUMINIUM	Al = 13.75	Al = 27·5
ANTIMONY (STIBIUM)	Sb = 122	Sb = 122
ARSENIC	As = 75	As = 75
BARIUM	Ba = 68.5	Ba = 137
BISMUTH	Bi = 210	Bi = 210
BORON*	B = 11	B = 11
BROMINE*	Br = 80	Br = 80
CADMIUM	Cd = 56	Cd = 112
CALCIUM	Ca = 20	Ca = 40
CARBON*	C = 6	C = 12
CERIUM	Ce = 46	Ce = 92
CHLORINE*	Cl = 35.5	Cl = 35·5
COBALT	Co = 29.5	Co = 59
CHROMIUM	Cr = 26.25	Cr = 52·5
COPPER (Cuprum)	Cu = 31.75	Cu = 63·5
FLUORINE*	F = 19	F = 19
GOLD (AURUM)	Au = 196.5	Au = 196·5
HYDROGEN*	H = 1	H = 1
IODINE*	I = 127	I = 127
IRON (Ferrum)	Fe = 28	Fe = 56
LEAD (Plumbum)	Pb = 103.5	Pb = 207
LITHIUM	L = 7	L = 7
MAGNESIUM	Mg = 12	Mg = 24
MANGANESE	Mn = 27.5	Mn = 55
MERCURY (Hydrargym.)	Hg = 100	Hg = 200
NICKEL	Ni = 29.5	Ni = 59

ELEMENTS.	SYMBOLS & ATOMIC WEIGHTS.	
	Old Notation.	*New Notation*
NITROGEN*	N = 14	N = 14
OXYGEN*	O = 8	O = 16
PHOSPHORUS*	P = 31	P = 31
PLATINUM	Pt = 98.5	Pt = 197
POTASSIUM (Kalium)	K = 39	K = 39
SILICIUM	Si = 22.2	Si = 28
SILVER (Argentum)	Ag = 108	Ag = 108
SODIUM (Natrium)	Na = 23	Na = 23
SULPHUR*	S = 16	S = 32
TIN (Stannum)	Sn = 59	Sn = 118
ZINC	Zn = 32.5	Zn = 65

WEIGHTS AND MEASURES.

The initial weight, or grain, is the same in both troy and avoirdupois.

Troy weight is no longer recognised in the Pharmacopœia, but physicians still employ the old ʒj, and ℈j, equal to 60 and 20 grains respectively.

WEIGHTS.

1 Grain gr.
1 Ounce oz. = 437·5 grains.
1 Pound lb. = 16 ounces = 7000 „

MEASURES OF CAPACITY.

1 Minim Min. or M
1 Fluid drachm Fl. drm. or f ʒ = 60 minims.
1 Fluid ounce Fl. oz. or f ℥ = 8 fluid drachms
1 Pint O. = 20 fluid ounces.
1 Gallon C. = 8 pints.

RELATION OF MEASURES TO WEIGHTS.

1 Minim	is the measure of	0·91	grs. of water
1 Fluid drachm	„	54.68	„
1 Fluid ounce	„ 1 ounce or	437.5	„
1 Pint	„ 1$\frac{1}{4}$ pound or	8750	„
1 gallon	„ 10 pounds or	70,000	„

EQUIVALENTS OF ENGLISH WEIGHTS TO FRENCH GRAMMES.

1 Pound avoirdupois	=7000	grs. or	16	ozs.	=453.592	French Grams.
	6562.5	„	15	„	=425.2425	„
	6125	„	14	„	=396.8925	„
	5687.5	„	13	„	=368.5435	„
	5250	„	12	„	=340.1935	„
	4812.5	„	11	„	=311.8445	„
	4375	„	10	„	=283.495	„
	3937.5	„	9	„	=255.1455	„
	3500	„	8	„	=226.796	„
	3062.5	„	7	„	=198.4465	„
	2625	„	6	„	=170.097	„
	2187.5	„	5	„	=141.7475	„
	1750	„	4	„	=113.398	„
	1312.5	„	3	„	= 85.0485	„
	875	„	2	„	= 56,699	„
1 Ounce	437.5	„	1	„	= 28.3495	„
	218.75	„	$\frac{1}{2}$	„	= 14,17475	„
	109.37	„	$\frac{1}{4}$	„	= 7.08737	„
	15.43				= 1	gramme.
	1.543 „				= 0.1	a decigramme.
1 Grain	1				= .0648	
	0.15 or $\frac{1}{7}$ nearly				= .01	a centigramme
	0.015 or $\frac{1}{70}$ „				= .001	a milligramme.

EQUIVALENTS OF FRENCH GRAMMES TO ENGLISH (AVOIRDUPOIS) WEIGHTS.

1 Litre= 1 Kilogramme.	1000	French grammes	=	35	oz. &	120	grs.
	900	,,	=	31	,, &	326¾	,,
	800	,,	=	28	,, &	96	,,
	700	,,	=	24	,, &	302¾	,,
	600	,,	=	21	,, &	72	,,
	500	,,	=	17	,, &	278¾	,,
	400	,,	=	14	,, &	48	,,
	300	,,	=	10	,, &	254¾	,,
	200	,,	=	7	,, &	24	,,
1 Decilitre =1 Hectogramme.	100	,,	=	3	,, &	230¾	,,
	90	,,	=	3	,, &	76⅓	,,
	80	,,	=	2	,, &	359½	,,
	70	,,	=	2	,, &	205⅓	,,
	60	,,	=	2	,, &	51	,,
	50	,,	=	1	,, &	334	,,
	40	,,	=	1	,, &	179¾	,,
	30	,,	=	1	,, &	25½	,,
	20	,,	=			308⅔	,,
1 Centilitre=1 Decagramme	10	,,	=			154⅓	,,
	5	,,	=			77⅙	,,
1 Millilitre= 1 gramme.	1	,,	=	nearly		15½	,,
	0·5	,,	=	,,		7¾	,,
1 Decigramme.	0·1	,,	=	,,		1½	,,
	·05	,,	=	,,		¾	,,
1 Centigramme.	·01	,,	=	,,		1/7	,,
	·005	,,	=	,,		1/14	,,
1 Milligramme.	·001	,,	=	,,		1/70	,,

TABLE TO FIND TROY EQUIVALENT FOR DECIMAL WEIGHTS.

Oz.		Oz.		Dwts.		Grains.
1·000	=	1		,,		,,
·900	...	,,	=	18	...	,,
·800	...	,,	...	16	...	,,
·700	...	,,	...	14	...	,,
·600	...	,,	...	12	...	,,
·500	...	,,	...	10	...	,,
·400	...	,,	...	8	...	,,
·300	...	,,	...	6	...	,,
·200	...	,,	...	4	...	,,
·100	...	,,	...	2	...	,,
·090	...	,,	...	1	...	19¼
·080	...	,,	...	1	...	14½
·070	...	,,	...	1	...	9½
·060	...	,,	...	1	...	4¾
·050	...	,,	...	1	...	,,
·040	...	,,	...	,,	...	19¼
·030	...	,,	...	,,	...	14½
·020	...	,,	...	,,	...	9½
·010	...	,,	...	,,	...	4¾
·009	...	,,	...	,,	...	4¼
·008	...	,,	...	,,	...	3¾
·007	...	,,	...	,,	...	3¼
·006	...	,,	...	,,	...	3
·005	...	,,	...	,,	...	2½
·004	...	,,	...	,,	...	2
·003	...	,,	...	,,	...	1½
·002	...	,,	...	,,	...	1
·001	...	,,	...	,,	...	½

TABLE TO FIND DECIMAL EQUIVALENT FOR TROY WEIGHTS.

Dwts.		Oz.
20	=	1·000
19	...	·950
18	...	·900
17	...	·850
16	...	·800
15	...	·750
14	...	·700
13	...	·650
12	...	·600
11	...	·550
10	...	·500
9	...	·450
8	...	·400
7	...	·350
6	...	·300
5	...	·250
4	...	·200
3	...	·150
2	...	·100
1	...	·050

Grains.		Oz.
24	=	0·050
23	...	·048
22	...	·046
21	...	·044
20	...	·042
19	...	·040
18	...	·038
17	...	·035
16	...	·033
15	...	·031
14	...	·029
13	...	·027
12	...	·025
11	...	·023
10	...	·021
9	...	·019
8	...	·017
7	...	·015
6	...	·013
5	...	·010
4	...	·008
3	...	·006
2	...	·004
1	...	·002

APPROXIMATE MEASUREMENT.

A teacup	4 ounces (fluid)
A wine glass	2 " "
A tablespoon of liquid ...	½ " "
A tablespoon of powder ...	2 drachms
A teaspoon of liquid ...	1 fluid drachm
A teaspoon of powder ...	About ½ drchm.
A teaspoon of magnesia ...	About 12 grns.
One drop of water	1 minim
One drop of essent: oils and tinct.	About ½ minim
One drop of chloroform ...	About ⅓ minim

Note.—The teaspoon and tablespoon in ordinary use vary in size, and are usually much too large, therefore a graduated measure-glass ought to be used.

EQUIVALENT MEASUREMENT.

Table of the number of drops of different liquids equal to one fluid drachm of water :—

Acetum opii	90
Acid: acet: dil:	55
Acid: hydrocyanicum dil. ...	52
Acid: hydrochloricum dil. ...	54
Acid: nitric: dil.	62
Acid: sulph: dil.	54
Acid: sulph: arom:	116
Alcohol	118
Chloroformum	180
Ether sulphuricus	150
Glycerinum	55
Liq: ammon.	49
Liq: iodi: co.	75
Liq: potass: arsen.	60
Liq: arsen: et hyd: iod. ...	52

Ol: olivæ	76
Ol: crotonis	80
Spt: æth: nit.	90
Tinct: aconit.	118
Tinct: ferri perchlor.	132
Tinct: opii	120
Vin: opii	78

PULSATION PER MINUTE AT VARIOUS AGES.

At birth	130 to 150
One year	108 to 130
Seven years	72 to 90
Puberty	80 to 85
Adult age	70 to 75
Old age	50 to 65

RESPIRATION PER MINUTE AT VARIOUS AGES.

First year	35
Second year	25
At puberty	20
Adult age	18

TABLE OF DOSES.

For Females the dose is somewhat less, and in advancing age the dose is gradually lessened.

Adult male	1 drachm	or 1
Fourteen years	½ drachm	or ½
Seven „	20 grains	or ⅓
Five „	minims or grains 15	or ¼
Three years	„ „ 10	or ⅙
One „	„ „ 6	or 1-10
Six months	„ „ 3	or 1-20
Three „	„ „ 2	or 1-30

SPECIAL PHARMACOLOGY.

Special Pharmacology treats of medicines individually.

ACIDUM CARBOLICUM.

CARBOLIC ACID.

Formula.—Old: $HO, C_{12}H_5O$.
New: **C_6H_5~~OH.~~**

Synonyms.—Phenol. Phenic Acid. Phenyl Alcohol.

Characters.—In colourless acicular crystals, which, at a temperature of 95°F., become an oily liquid, having a strong odour and taste resembling creasote. Sp. gr. 1·065; boiling point 370°F. Does not redden litmus. The crystals readily absorb moisture from the air, and become liquid. Slightly soluble in water, freely so in alcohol, ether, and glycerine. It may be liquified by the addition of a few drops of glycerine, or by immersing the bottle containing it in hot water. The reddening of the acid has been ascribed to the access of air containing ammonia or ammonium nitrite; also to the presence of copper in the acid acted upon by the ammonia of the atmosphere.

Preparation.—Obtained from coal-tar by fractional distillation, and subsequent purification.

Physiological Effects and Therapeutics.—It is used for the same purposes, and in the same way as creasote. Its use in medicine, however, has principally been as an external application to correct the fœtor of gangrenous and other secreting surfaces, and to destroy septic germs. While carbolic acid subdues offensive odour it does not completely arrest the activity of free bacteria.

It possesses stimulant, narcotic, styptic, antiseptic, and escharotic properties, uniting with albumen and gelatine, forming insoluble compounds.

It obtunds sensitive dentine, and it is a common practice to mop out the prepared cavities of teeth prior to filling them. A mixture of four parts of the acid and three of collodion is likewise recommended for painting carious cavities. It also relieves toothache arising from an exposed or nearly exposed pulp. When suppuration of the pulp has set in, it arrests that process, inducing a healthy reaction without irritation, its application being repeated so long as pus forms; but the treatment should not be continued if the eschar previously produced still remain attached.

In cases where the pulp is healthy, but exposed, it should be applied until the pulp is thoroughly blanched; the pulp should then be capped either with a piece of bibulous paper, or with any other substance suitable to form a cap, saturated with the acid, and any excess mopped out with fresh bibulous paper or cotton. The cavity may then be filled partially (or entirely) with a temporary, and completed with permanent stopping.

In a paper read before the Odontological Society, in 1878, by Mr. C. S. Tomes, there was a very general expression of opinion in favour of the use of dilute carbolic acid in the treatment of exposed pulp. The theory advanced by Mr. C. S. Tomes was that the destruction of the odontoblast layer, by the strong acid, was unfavourable to the production of a benign calcification, in the form of dentine of repair. He says, "when calcification takes place normally in the odontoblast layer, the vessels and nerves recede before it, so that they cannot become involved in it; when, however, calcification, deserting the odontoblast layer, appears more deeply in the pulp, as it often does in the form of globular calcifications, it is likely that nerves and blood vessels which have not receded before it would be implicated by it, and pain result."

It is a useful agent in the treatment of periostitis and alveolar abscess. Some practitioners have observed that the first effect of the application of the acid to a suppurating surface, as an alveolar abscess, has been to increase the suppuration; but in a day or two the discharge of pus very markedly diminishes in amount.

In different degrees of dilution it forms an invaluable antiseptic lotion in ulcerations of the mouth, &c.

Dr. A. H. Smith gives the results of some trials made upon his own person of the action of this acid as a local anæsthetic. He painted a spot on his forearm, about an inch in diameter, with Carbolic Acid of about 85 per cent. For a minute there was a burning sensation, after which the integument became entirely insensible, the cuticle being whitened and shrivelled, and the spot slightly elevated. He then made an incision of half-an-inch in extent without even feeling the contact of the knife. The capillary circulation seemed not to be interfered with, as the blood flowed freely as it would have done under ordinary circumstances. Three hours after the application of the acid, a needle could be thrust into the skin without causing pain.

In a second experiment, ten minutes after applying the acid, a blister was placed on the spot and remained 8½ hours, neither causing pain, nor producing vesication.

He also found it serviceable in deadening sensibility previous to incising a whitlow.

A mixture of one part of acid and twelve parts of glycerine may be applied to the palate by means of a brush to stimulate the mucous secretion where deficient, and thereby aid the suction of an upper denture.

Antidotes.—Saccharate of lime, lime water, and precipitated carbonate of lime have each been suggested as Antidotes for Carbolic Acid. The precipitated carbonate of lime is not really an Antidote, any good there is in it simply arises from its absorbent action. Lime water is of little service as it contains so little lime. The saccharate of lime combines with the acid forming a non-poisonous salt. Sulphate of Soda, in doses of 75 to 120 grains in 6 ounces of water for adults, for children a proportionate quantity, is useful in the treatment of the poisonous effects of Carbolic Acid. Also Apomorphia, by the mouth $\frac{1}{5}$ of a grain, by sub-cutaneous injection $\frac{1}{10}$ of a grain.

The effects of its escharotic action are reduced by olive oil, glycerine, or vaseline.

For forms see Pharmacopœia.

See Creasotum.

ACIDUM CHROMICUM.

CHROMIC ACID.

Synonym.—Chromium Trioxide.

Formula.—Old: $HOCrO_3$. New: CrO_3.

Characters.—This acid occurs in the form of brilliant crimson-red crystals. It is deliquescent, and very soluble in water, forming an acid solution of chromic acid, H_2CrO_4.

Preparation.—Obtained in acicular crystals, by the action of strong sulphuric acid upon a cold saturated solution of bichromate of potash.

Properties and Uses.—It is one of the most powerful escharotics known, and acts as a rapid destroyer of organic matter. It has been recommended for bleaching discoloured teeth, and to obtund sensitive dentine; but its application produces so much pain, and it is so destructive to the tissues, that its use requires great skill and judgment not to do more mischief than good.

For morbid growths upon the gums, it is a valuable remedy, if intelligently employed, and may be used deliquesced or diluted, according to the effect desired. It may be conveniently applied by means of a gold or platinum wire. Great care should be exercised to protect the healthy parts.

In ulceration and retraction of the gums, chromic acid has been recommended as one of the best applications. A mild solution may be used at first, and afterwards one containing one part of the acid to eight parts of water, or even twice that strength, to be applied by means of a sponge.

A 3 per cent. solution is an excellent agent for hardening the soft tissues, for microscopic section, and, with the addition of a few drops of hydrochloric acid, the calcified structures are at the same time softened. The addition of a few crystals of chromic acid is required every three or four days. Portions of jaw and teeth *in situ* may in that way be obtained.

ACIDUM GALLICUM.

GALLIC ACID.

Formula.—Old: $3HO, C_{14}H_3O_7 + 2HO$.
New: $\mathbf{C_7H_6O_5}$.

Characters.—Small, acicular, silky, nearly colourless crystals, with an acid and astringent taste; slightly soluble in cold water, more so in glycerine, freely in hot water or alcohol. Twenty grains of citrate of potash will dissolve as much as fifteen grains of gallic acid in an ounce of water, and remain quite clear for any length of time. It produces a deep, bluish-black colour with persalts of iron, in which it agrees with tannic acid; but unlike tannic acid, does not precipitate solutions of gelatine, albumen, or the salts of the alkaloids.

Preparation.—The coarsely powdered galls are made into a paste with water, and exposed to the action of the air for six weeks, at a temperature between 60° and 70°F. The paste is then boiled with water, and filtered whilst hot; on cooling, the acid is deposited, and may be purified by subsequent solution and re-crystallization.

Physiological Effects and Therapeutics.—Gallic acid acts principally as a remote astringent. Dr. Todd says that in all cases of hæmorrhage dependent on hæmorrhagic diathesis, he considers Gallic acid to be the best styptic we possess. In acute tonsilitis, in the form of gargle, great benefit is derived from its use.

Dose.—3 to 20 grains (about 4 grains being soluble in 1 oz. of cold water).

ACIDUM HYDROCHLORICUM.

HYDROCHLORIC ACID.

Synonyms.—Muriatic acid, Spirits of salts.

Formula.—**HCl.**

Characters.—A nearly colourless and strongly acid liquid, emitting white vapours, having a pungent odour. Sp. gr. 1·16.

Preparation.—Obtained by the distillation of a mixture of chloride of sodium, sulphuric acid, and water. The gaseous product, previously washed, is conducted into a receiver containing water until the density of the same has become 1·16.

Physiological Effects and Therapeutics.—It has been employed in ulcerated sore throat, in scrofulous and venereal affections; as a caustic in phagedœna, though inferior to nitric acid. Van Swieten employed it in cancrum oris. In a diluted form it has been spoken of in the highest terms as a gargle in diphtheria, and in ulcerations of the throat and mouth, also as a tonic, refrigerent, and astringent.

Uses.—Its action upon the teeth being deleterious, its use should be followed by an alkaline mouth wash. Used in the laboratory as a "pickle" for gold and platinum plates, zinc and borax being dissolved by it.

Dose.—Of the diluted acid, 10 to 30 minims, *largely diluted.*

ACIDUM NITRICUM.

NITRIC ACID.

Synonym.—Aqua fortis.

Formula.—Old: HO, NO_5. New: **HNO_3.**

Characters.—A colourless liquid, which, when exposed to the air, emits an acrid corrosive vapour. Sp. gr. 1·42.

Preparation. — Prepared from nitrate of potash, or nitrate of soda, by distillation with sulphuric acid and water. It contains 70 per cent. by weight of nitric acid, or 60 per cent. of nitric anhydride.

Physiological Effects and Therapeutics.—In the concentrated form the acid is powerfully escharotic and corrosive, which property it derives in part from its affinity for water, but more especially from the facility with which it gives out oxygen. The permanent yellow stain which it communicates to the cuticle is peculiar to it, and this is illustrated in the condition of the tongue and pharynx in cases of poisoning, as represented by Dr. Roupell. Like sulphuric acid it chars the animal tissues. In sloughing phagedœna (cancrum oris, &c.,) its application is attended with most successful results. It is a most powerful escharotic, and has been used in cases of exposed and sensitive pulp, but its employment requires the greatest care, as its contact with the dentine causes its disintegration.

Diluted it is an alterative, tonic, and refrigerent. It has been beneficially used in syphilitic diseases where mercury would have been useless or hurtful. In scrofulous subjects it may be given in conjunction with the compound decoction of sarsaparilla.

Its action upon the teeth being deleterious, an alkaline mouth wash should be used to correct that. Diluted (1 drachm to 1 or 2 pints of water) it is a good local application to sloughing and other ill-conditioned sores.

It readily dissolves silver; it has no action upon gold; but when mixed with two parts of hydrochloric acid (forming aqua regia) a solvent for this latter metal is formed.

Dose.—Of the diluted acid, 10 to 30 minims, *largely diluted.*

ACIDUM PHOSPHORICUM DILUTUM.

DILUTE PHOSPHORIC ACID.

Formula.—Old: $3HO, PO_5$. New: $\mathbf{H_3PO_4}$.

Characters.—A colourless liquid, with a sour taste and strongly acid reaction. Sp. gr. 1·08.

Preparation.—Diluted nitric acid and phosphorous, treated together in a flask, with a large funnel in the mouth of it, containing a smaller one inverted, to condense the nitric acid; the phosphorus is oxidised at the expense of the nitric acid. Phosphor*ous* and phosphor*ic* acids are produced, while nitric oxide is evolved. By concentrating the distillate the phosphorous acid is converted into phosphoric acid by the free nitric acid present. The excess of nitric acid is driven off by evaporation. It is afterwards diluted to bring it to the required strength.

Mr. W. F. Horn describes a new process for the preparation of phosphoric acid, the main features of which are the agitation of the phosphorus under water with a minute proportion of iodine, and its subsequent oxidation by nitric acid without application of heat. The theory of this process is based on the observations of Dr. Brodie that iodine converts the vitreous phosphorus into the amorphous variety, which is readily oxidised by nitric acid.

Physiological Effects and Therapeutics.—It is sometimes given in affections of the nervous system. In scrofula it is said to exercise a very beneficial effect in a large number of cases; and as a therapeutic agent, it will be found in no degree inferior to iodine, cod-liver oil, or barium.

The benefits to be derived from the use of phosphatic salts are noticed elsewhere. (See Calcis Hypophosphis, &c.)

Dose.— 10 to 30 minims.

ACIDUM SALICYLICUM.

SALICYLIC ACID.

Formula.—Old: $HO,C_{14}H_5O_5$.

New: $\mathbf{HC_7H_5O_3}$. or $\mathbf{C_6H_4OH\ CO_2H}$.

Characters.—Salicylic Acid is met with in minute white acicular crystals, often of a cream colour, owing to the presence of a little colouring matter. It is odourless, has a sweet and afterwards a dry taste, with an impression of acidity. Solubility in boiling water, 1 in 9; in cold water, 1 in 760; proof spirit, 1 in 15; in rectified spirit, 1 in 4; in glycerine, 1 in 195. Twenty grains of salicylic acid are rendered soluble in a fluid ounce of water by the addition of 20 grains of acetate of potash, or 25 grains of borax, or 40 grains of citrate of potash. An aqueous solution of salicylic acid gives a deep violet colouration with persalts of iron.

Preparation.—Salicylic acid is produced—
1. By passing carbonic acid into a mixture of carbolic acid and caustic soda at a high temperature, and decomposing the resulting salicylate of soda with hydrochloric acid.

2. From salicylol ($C_7H_6O_2$,) by oxidation with a solution of chromic acid; or by melting salicylol or salicin with potassium hydrate, in which case hydrogen is evolved.

3. Coumaric acid, heated with potassium hydrate, yields potassium salicylate and acetate.

4. Oil of wintergreen *(Gaultheria procumbens)*, which consists of acid methyl salicylate, is resolved, by distillation with potash, into methyl alcohol and salicylic acid. Salicylic acid crystallises from its alcoholic solution by spontaneous evaporation in large monoclinic prisms.

Physiological Effects and Therapeutics.—It has been largely used as a febrifuge to reduce the temperature in acute rheumatism, &c. It is also used in chronic rheumatism to relieve the swelling and pain of affected parts. In neuralgia of a periodic type, when not amenable to quinine, salicylic acid has proved beneficial in 10 to 40 grains every three or four hours.

It is a powerful antiseptic and disinfectant, said to be three times more effectual in preventing fermentation than carbolic acid. A little placed in contact with a moist mucous surface speedily converts it into a dry, white, shrivelled membrane. It has been applied with varying success to suppurating pulps. In solution it has been recommended in the treatment of aphtha, thrush, and other ulcers of the mouth. But by some practitioners it is considered to have a prejudicial effect upon the teeth, causing a grittiness and softening of their surface. The safe use of the acid as a dentifrice is, therefore, questionable. √

Dose.—10 to 20 grains.

ACIDUM SULPHURICUM.

SULPHURIC ACID.

Synonym.—Oil of Vitrol, Vitriolic Acid.

Formula.—Old: HO,SO_3. New: $\mathbf{H_2SO_4}$.

Characters.—A colourless, oily liquid, intensely acid and corrosive. Sp. gr. 1·843. It evolves much heat on the addition of water. It contains 96·8 per cent. by weight of the sulphuric acid, and corresponds to 79 per cent. of sulphuric anhydride.

Preparation.—Sulphurous acid gas, nitric acid vapour, air, and steam are simultaneously admitted into oblong leaden chambers containing water at the bottom. The sulphurous acid is obtained by burning sulphur in a proper furnace. The nitric acid vapour is produced by heating nitrate of potash with sulphuric acid in an iron pot, sulphate of potash is formed, and nitric acid set free. Jets of steam supply the necessary moisture for condensation. It is then drawn off, evaporated first in leaden vessels, and finally in glass or platinum ones. The sulphurous fumes are sometimes obtained from iron pyrites, but when this is the source the acid is usually contaminated with arsenic.

Physiological Effects and Therapeutics.—The strong acid is a corrosive poison; the parts touched with it first become white, but subsequently assume a brownish-black appearance. The dilute acid is refrigerant, astringent, and tonic.

It may be prescribed in *Dyspepsia*, when accompanied by an alkaline condition of the secretions. Largely diluted it has been recommended by M. Gendrin and Dr. H. Bennet in *lead poisoning*. In *hæmorrhage*, although less certain in its action than the acetate of lead, gallic acid, and other remedies, it is a very useful adjunct. In syphilitic and some other cutaneous affections, the internal use of the dilute acid proves highly beneficial. In the bites of rabid animals, Dr. W. Fraser considers that the strong acid is the best caustic that can be employed.

Dose.—Of the dilute acid, 5 to 20 minims, *freely diluted.*

ACIDUM SULPHUROSUM (In Solution).

SULPHUROUS ACID.

Formula.—Old: HO,SO_2. New: $\mathbf{H_2SO_3}$.

Characters.—A colourless liquid, with a pungent sulphurous odour. The solution gradually absorbs oxygen from the air, and becomes converted into dilute sulphuric acid, a little is also formed during the solution of the gas in the water. It should, therefore, be freshly prepared and kept in well-filled blue bottles. Evaporated, it leaves no residue. Sp. gr. 1·04.

Preparation.—Sulphurous acid gas is prepared by heating together in a glass flask sulphuric acid and wood charcoal, with water. The gas evolved is conducted through water in a wash-bottle, and from thence into distilled water, until the bubbles of gas pass through the solution undiminished in size.

Physiological Effects and Therapeutics.—This acid, owing to its affinity for oxygen, is a good oxidizing agent. It is a disinfectant and antiseptic; its action, whether given internally or applied externally, depending apparently on its power of destroying the parasitic organisms which infest the human body.

Dr. Dewar applies it in three ways. 1. In solution; 2. By fumigation (generated by burning sulphur); 3. In spray. Its use has been strongly advocated by Dr. Dewar and others in *bronchitis*, *croup*, *tonsilitis*, *laryngitis*, and various affections of the throat, whether *aphthous* or *diphtheric*. Dr. Purdon relates a case of *syphilitic ulceration* of the throat, which yielded to sulphurous acid applied in the form of spray, after other ordinary means had failed. In fungoid affections of the mouth, as thrush *(oidium albacans)* and *leptopthryx buccalis*, the diluted acid has been well spoken of as a wash or gargle, of the strength of 1 to 5 of water.

It is extremely serviceable in obstinate cases of *vomiting* and *eructations*, and also in that form of fermentive dyspepsia which is associated with the development of *Sarcina ventriculi.*

It is used as a bleeching agent, uniting with the oxygen of the water or colouring matter present.

Dose.—Pharmacopœia acid, from ½ to 1 drachm, diluted.

ACIDUM SULPHURICUM AROMATICUM.

AROMATIC SULPHURIC ACID.

Synonym.—Elixir of vitriol.

Preparation.—Sulphuric acid, 3; rectified spirit, 40; cinnamon in powder, 2; ginger in powder, 1½ parts. Mix the acid gradually with the spirit, add the powders, and macerate for seven days and filter.

Physiological Effects and Therapeutics.—Similar in its action to dilute sulphuric acid. The local use of this preparation, half strength, has been recommended in treatment of Pyorrhœa Alveolaris (Rigg's disease). To soften the calcareous deposit, which is nearly always present upon the affected root and frequently near the apex, and so difficult of complete removal, as well as to dissolve the carious portion of the alveolar border, small pledgets of cotton saturated with the mixture may be placed in the peculiar pocket or sinus which exists beneath the free edge of the gum; this is allowed to remain for one or two hours and then, after its removal, syringing and thoroughly cleansing the parts. Its stimulating action also favours healthy granulation. It has also been used as an injection into the sinuses leading to necrosed and carious bone; and in alveolar abscess which does not readily yield to treatment with carbolic acid, eucalyptus oil, &c. There is usually some pain caused by the application.

Dose.—5 to 30 minims.

ACIDUM TANNICUM.

TANNIC ACID.

Formula.—Old: $C_{54}H_{22}O_{34}$. New: $\mathbf{C_{27}H_{22}O_{17}}$.

Characters.—In pale yellow, vesicular, uncrystallizable masses, or thin glistening scales, with a strongly astringent taste and an acid reaction; readily soluble in water and rectified spirit, very sparingly soluble in ether. It forms a dense white precipitate with lime water; an aqueous solution becomes a bluish-black colour upon the addition of the persalts of iron; and with a solution of gelatine a yellowish-white precipitate is thrown down. It is entirely volatilized by heat.

Preparation.—Powdered galls are exposed to a damp atmosphere for two or three days, and then sufficient ether is added to form a soft paste, this is allowed to stand for twenty-four hours in a clean vessel. It is then submitted to pressure as quickly as possible, and the pressed cake again treated with ether to which 1-16th of its bulk of water has been added; this is allowed to stand as before, and is again pressed. The expressed liquids are now mixed, and, in the first place, allowed to evaporate spontaneously; then, by the aid of a little heat, reduced to a syrupy consistence, and lastly dried on plates in a hot air chamber at a temperature not exceeding 212°F.

A new and beautiful form of tannic acid is now being produced in Germany. It is made by allowing a syrupy ethereal solution of tannic acid to run from a perforated vessel through a warm atmosphere, for a distance of about 16 feet, on to a rapidly revolving cylinder, from which it is removed in the shape of fine threads, presenting a pseudo-crystalline appearance.

Physiological Effects and Therapeutics.—Tannic acid is the most powerful of all the vegetable astringents or styptics. As a topical astringent it is far more powerful than gallic acid, because its action on albumen, gelatine, and fibrin is energetic, while gallic acid exerts no action on these substances.

Tannic acid is used as an astringent chiefly in hæmorrhages and profuse secretions. Its remote action is probably due to its conversion into gallic acid in its passage through the system. Applied to *spongy gums*, it causes contraction of the vessels, and, furthermore, checks the tendency to absorption and consequent loosening of the teeth. It is a useful application to abrasions, aphthous and other ulcers of the mouth.

In the form of lozenge it is very beneficial to relaxed uvula and tonsils, or sore throat.

As an injection (1 to 5 grains in 1 oz. of water) in some diseased conditions of the antrum it has been found serviceable.

A strong solution in alcohol, glycerine, or carbolic acid, when applied to a carious cavity, allays the sensitiveness of, and hardens softened dentine. It is taken as a snuff in relaxed and diseased condition of the mucous membrane of the nose.

Dose.—3 to 20 grains.

ACONITUM NAPELLUS.

ACONITE.

Synonyms.—Common Monkshood, Wolfsbane.

Botany.—A perennial plant belonging to the Natural Order *Ranunculaceæ*—the Crowfoot or buttercup order. It has been found by the side of rivers and brooks in Herefordshire and Somersetshire, but is not considered to be strictly indigenous. It is cultivated for the sake of its leaves and flowering tops, from which an extract is made. The roots, which are employed for making the liniment and tincture, and for extracting the alkaloid, are imported from Germany, and should be collected in the winter or early spring.

Chemistry.—It contains an alkaloid, *aconitia* or *aconitine*, upon which the activity of the drug depends. This exists in the plant, more particularly in the root, in combination with aconitic acid.

Physiological Effects and Therapeutics.—This drug is a cerebro-spinant, producing, in large doses, numbness and tingling of the parts about the mouth and throat, and of the extremities; vomiting, contracted pupil, and failure of the circulation.

A benumber is obviously the physiological remedy for increased sensibility of the nerves; therefore, in neuralgia and rheumatism it is most serviceable. Some practitioners go so far as to assert that in facial neuralgia they find no remedy equal to it. When the effects of the drug are desired to be produced quickly, half-a-drop, or a drop of the tincture in a teaspoonful of water should be given every quarter of an hour for two hours, and afterwards hourly; but if prostration and a weak pulse exist a smaller dose must be given. The power of aconite, when given in repeated and small doses, to control, or at times cut short inflammation, is remarkable; and though it does not cause their removal, yet it prevents the formation of inflammatory products.

In inflammation, it is supposed to act by paralysing the nerves of the part, thus destroying the incitement to the local afflux of blood, favouring resolution, and limiting the size of the abscess where pus is already formed. Combined with iodine, it is a common local remedy for dental periostitis; and it is also used externally in the form of liniment and ointment.

A drop or two on cotton-wool, introduced into the socket of a tooth after extraction, will give immediate relief to the occasional after-pain. It is a potent dressing in the canals of teeth as a preventive to periodic irritation, and is sometimes a useful application to an inflamed pulp. Care should be taken not to apply an excess.

Dose.—From 5 to 10 drops of the tincture of the British Pharmacopœia, which is about one-sixth the strength of Fleming's Tincture.

Antidote.—See poison table.

ACTÆA RACEMOSA.

BLACK SNAKE ROOT.

Synonyms.—Cimicifuga racemosa, Cohosh, Bugbane.

Botany.—A perennial herb, growing in the North American woods as far as Florida, belonging to the natural order *Ranunculaceæ*—the Crowfoot or buttercup order.

Characters.—The root is dark brown, of bitter acrid taste, and heavy odour; it is composed of short, knotty, twisted rhizomes about half-an-inch thick, and from one to three or four inches in length. Its activity is due to a resinous principle termed *cimicifugin* or *macrotin*, a dark brown powder, readily soluble in alcohol. It is prepared from a concentrated tincture by the addition of water.

Physiological Effects and Therapeutics.—It is a nervine tonic and sedative, given internally for neuralgia and rheumatism. Actæa is said to be useful in simple and malignant sore throat, and in that troublesome, chronic, and obstinate disease, in which the mucous membrane of the pharynx is quite dry and spotted over with inspissated mucus. The preparations of this plant have been much used in acute rheumatism, and it is stated that they quell the pain speedily. Actæa is also extolled for lumbago and sciatica, and is said to subdue lumbago more effectually than any other remedy. Dr. Ringer says this remedy is especially indicated when the disease is traceable to some previous derangement of the uterus.

Actæa has been recommended in the headache arising from over-study or excessive fatigue.

Dose.—30 to 60 minims of the tincture.

ÆTHER.

OXYDE OF ETHYLE.

Synonyms.—Ether, Sulphuric Ether.

Formula.—Old: C_2H_5O. New: $\mathbf{C_4H_{10}O}$.

Chemistry.—Though formerly termed sulphuric ether, it contains no sulphuric acid.

Characters.—It is a colourless, very volatile and inflammable liquid, having a strong and peculiar odour, boiling below 105°F., having a sp. gr. of 0·735, and containing 92 per cent. of pure ether. When fifty measures of ether are agitated with an equal volume of water, the ether is reduced to forty-five volumes, by the absorption of 10 per cent. by the water It evaporates without residue. It possesses neither acid nor alkaline properties, but by exposure to air and light it absorbs oxygen, by which acetic acid and oxygen are produced. Soluble in 10 parts of water. Alcohol dissolves it in all proportions. Volatile oils, fatty and resinous substances, some of the alkaloids, caoutchouc, and gun-cotton, are soluble in ether, the last named forming collodion. If pure, ether will not redden litmus paper.

Preparation.—Obtained by distilling a mixture of rectified spirits of wine and sulphuric acid, agitating the distillate with chloride of calcium and slaked lime, and re-distilling. *Pure Ether* is prepared by washing the above with water to remove any spirit, decanting the supernatant ether and digesting it with recently burned lime and chloride of calcium, and, lastly, re-distilling.

Physiological Effects and Therapeutics.—Pure ether is more suitable for medicinal purposes. It is principally valuable as a speedy and powerful agent in spasmodic and painful affections which are not dependent on local vascular excitement. Local anæsthesia is frequently produced by means of ether applied in the form of spray, the insensibility being caused by the intense cold resulting from its rapid evaporation. It has been successfully used in this way in performing minor operations, such as the extraction of a tooth, the opening of an abscess, and the removal of small tumours.

The vapour of ether, either alone, or with chloroform, or nitrous oxide, is also used as a general anæsthetic.

The usual effects produced by the inhalation of ether are a primary and temporary stimulation of the heart, followed by relaxation and loss of power over the voluntary muscles, insensibily to pain, and profound coma.

The narcotic effects of ether are first upon the functions of the cerebrum, then upon the sensory and motor functions of the medulla, paralysing the respiratory centres, and, afterwards, the blood-vessels and heart, death arising usually by apnœa or by coma. In the early stages the pupils are contracted, but when anæsthesia is complete they are dilated.

From its stimulating action upon the heart there is much less danger of syncope than from the inhalation of chloroform; but it is less persistent in its narcotic influence, and bleeding is increased. It is difficult to obtain complete muscular relaxation, and to keep the patient absolutely quiet; ether also causes an increased flow of saliva and mucus.

On account of ether increasing the blood pressure, many administrators recommend it not to be given either to infants under six months, or to adults above sixty years of age.

"Notwithstanding many assurances to the contrary, it must be apparent that a condition so closely resembling death cannot be produced by any agent whatever without great risk of life; where morbid conditions of the heart, lungs, or brain exist, or when the administration is carelessly performed, or the administrator is ignorant of physiology, unable to estimate the life-power of his patient, and to read intelligently the successive steps of the unnatural condition which he is producing, and unless he can read these manifestations as he would an open book, he should not venture upon the experiment. A knowledge, too, of the most appropriate remedies and treatment, when signs of danger appear, and having those remedies within instant reach, are absolutely essential; nor can the great importance of employing a perfectly pure article be overrated."—WHITE.

Administration.—When given alone an inhaler is made by folding a towel into a large cone or bag, and then placing a coarse sponge in its apex. Half an ounce or more of ether is then poured upon the sponge, and repeated as necessary, by removing the cone from the patient's mouth; the quantity used varying from six drachms to eight ounces. The lower part of the face, the mouth and nose are covered with the cone, so as to exclude most of the air, and the patient is allowed to breathe through the cone. Owing to the ether irritating the respiratory mucous membrane, there is generally some coughing and struggling at the commencement of the inhalation. If the face of the patient become livid or very pale, the cone should be removed until that condition disappear.

A frequent mode of administering ether is to first give (by means of a special apparatus) nitrous oxide for about thirty seconds, then gradually add, and afterwards exclusively give, the vapour of ether.

Dose.—20 minims to 1 drachm.

Antidote.—*Vide* Chloroformum and Nitrosum Oxidum.

ALCOHOL.

ALCOHOL.

Formula.—Old: $C_4H_6O_2$. New: $\mathbf{C_2H_6O}$.

Characters.—A colourless, limpid liquid, free from empyreumatic odour, entirely volatilised by heat, and not rendered turbid by admixture with water. Sp. gr, 0·795. When placed in contact with anhydrous sulphate of copper it does not give rise to any blue colour, thus showing the absence of water. Alcohol absolutely free from water does not dissolve permanganate of potash, and, therefore, remains colourless.

Preparation.—Prepared by the distillation of a mixture of rectified spirits of wine with carbonate of potash and slacked lime.

A spirit much stronger than the Pharmacopœia rectified spirit, but not so strong as alcohol, may be obtained extemporaneously by adding carbonate of potash to rectified spirit, allowing them to remain a few days, with occasional agitation.

Physiological Effects and Therapeutics.—As a styptic, it restrains hæmorrhage from weak and relaxed parts; coagulates the blood by its influence on the liquid albumen, and causes contraction of the mouths of the bleeding vessels by its astringent qualities.

To whatever part it is applied it gives rise to contraction and condensation of the tissues. The affinity it has for water causes it to abstract the latter from the soft living tissues, with which it comes in contact, and when these are of an albuminous nature, it coagulates the albumen and causes increased density and firmness, hence it is very serviceable in cases of softened and sensitive dentine.

It is also the best agent to use for thoroughly drying the cavities of teeth before plugging.

ALOE BARBADENSIS.

BARBADOES ALOES.

Botany.—The juice of the leaf of the *Aloe Vulgaris*, inspissated; usually imported from Barbadoes in gourds.

Chemistry.—The Barbadoes Aloes contains a larger proportion of aqueous extract than the Socotrine Aloes, to which its more purgative properties are probably due.

For further particulars regarding Aloes, see *Aloe Socotrina.*

ALOE SOCOTRINA.

SOCOTRINE ALOES.

Botany.—The inspissated juice of one or more undetermined species of Aloe, a genus of plants belonging to the Natural Order *Lilaceæ*—the Lily order. It is procured chiefly in Socotra, and shipped to Europe by way of Bombay.

Chemistry.—A principle named *Aloine* has been obtained from nearly all the varieties of aloes; also a resinous substance, and an acid termed Aloetic acid. According to Dr. Royle, a small quantity of volatile oil is sometimes met with.

Characters.—It occurs in reddish-brown masses, opaque or translucent at the edges; and breaks with an irregular, or smooth and resinous fracture, sometimes exhibiting considerable transparency. When reduced to powder its colour is orange yellow. It has a very bitter taste, and a strong, fragrant, somewhat fruity odour; is entirely soluble in proof spirit, and during its solution exhibits under the microscope numerous minute crystals.

Preparation.—The juice, obtained from the cut leaves by compression, is allowed to settle; the clear liquor is then poured off, and inspissated in the sun.

Physiological Effects and Therapeutics.—In small doses, aloes acts as a tonic to the alimentary canal, assisting the digestive process, strengthening the muscular fibres, and promoting the secretions, especially that of the liver. In larger doses it acts as a purgative. It is slow in its action, and acts especially upon the large intestines. The uterus, in common with all the pelvic viscera, is stimulated by aloes. As a purgative, aloes holds an intermediate rank between rhubarb and senna.

It should not be given in inflammatory conditions, nor in organic diseases of the liver, in biliary calculi, in irritation or hæmorrhage from the uterus and rectum, nor during pregnancy. It sometimes causes hæmorrhoids, and is not given in such cases, except it be in the form of the aqueous extract.

It may be given with especial advantage in habitual constipation ; in loss of appetite and dyspepsia ; and to promote the secretion of bile. One or two grains of ipecacuanha, combined with each dose of aloes, have the effect of diminishing, and often of altogether removing, its irritating effect upon the anus. According to Dr. Christison iron increases the purgative power of aloes.

Dose.—From 2 to 6 grains of the powder, or of the extract.

ALUMEN.

ALUM.

Formula—Old: $NH_4OSO_3Al._2O_33SO_3+12HO$
New : $\mathbf{Al.\ (NH_4)}\ 2\mathbf{(S0_4)}\ 12\mathbf{H_20}$.

History.—Found native in the neighbourhood of volcanoes, and constitutes the mineral called native alum, from which may be obtained the metal aluminium. The alum of commerce is now generally made with ammonia, as its formula indicates. Roche alum usually consists of crystalline fragments of alum coloured with Venetian red or Armenian bole.

Preparation.—In this country it is procured from aluminous slate, shale, or schist, a combination of alumina with iron, sulphur, &c. This is gently roasted, then exposed to the air in a moistened state, oxygen is absorbed, the sulphur becomes acidified, and ferrous sulphate and sulphate of alumina are produced. The iron is removed by the addition of chloride of potassium or ammonium to the concentrated solution, according as the potassium or ammonium salt may be required; the alum is crystallised out, and purified by re-solution and re-crystallisation.

Characters.—Alum occurs in colourless, transparent crystalline masses, exhibiting the focus of the regular octahedron, and having a sweetish astringent taste.

Alumen Exsiccatum.—*Dried Alum* is simply the salt deprived of its water of crystallisation.

Physiological and Therapeutic Effects.—It acts chemically on the animal tissues; forming insoluble compounds with albumen and gelatine, coagulating in membrane-like flakes the albumen of saliva, mucus, pus, &c. The immediate topical effect is that of an astringent, by virtue of which it checks or temporarily stops exhalation and secretion, and produces paleness of the part by diminishing the diameter of the small blood vessels. Taken in large and repeated doses the astriction is soon followed by irritation, and the paleness by a preternatural redness, resulting in nausea, vomiting, griping and purging.

As an emetic it produces less prostration than antimony or ipecacuanha. As a gargle, it forms a useful remedy in relaxation of the throat, and congestion of the gums and mucous membranes; as a styptic in hæmorrhage, as a repellant in certain inflammations, and in lead collic it forms an innocuous sulphate. It is also an occasional ingredient in tooth powders; but on account of sulphuric acid being set free in the mouth, its use for this purpose is not without danger.

A solution of alum in spirit of nitric ether is said to be an effective application in toothache.

The dried or burnt alum when applied to young tissues is escharotic, hence it is useful to repress fungous granulations.

Incompatibles.—Alkalies and their carbonates, and acetate of lead.

Dose.—From 5 to 40 grains.

ALUMINII CHLORIDUM.

CHLORIDE OF ALUMINIUM.

Formula.—$AlCl_3$.

Characters.—Aluminium chloride is a transparent waxy-like substance, yet having a crystalline structure, colourless when pure, but generally exhibiting a yellow colour, due perhaps to the presence of iron. It boils at about 180°, fumes in the air, and smells of hydrochloric acid. It is very deliquescent, and dissolves readily in water; the solution, when left to evaporate, yields the hydrated chloride in six-sided prisms, which, when heated, are resolved into alumina and hydrochloric acid.

Preparation.—The anhydrous chloride may be prepared by heating a mixture of alumina and finely divided carbon in chlorine gas.

Physiological Effects and Therapeutics.—The hydrated chloride appears to be a valuable antiseptic, quite as potent as chloride of zinc or carbolic acid, and at the same time non-poisonous and devoid of unpleasant smell of any kind. It was introduced to the notice of the medical profession by Mr. John Gamgee.

Chloralum, a compound containing 10 to 15 per cent. of the chloride of aluminium, besides such impurities as arsenic and copper—and which is also said to be a compound of the sulphate and the chloride of aluminium—, is much used as a disinfectant deodoriser, and as a hæmostatic when applied by means of cloth or cotton impregnated with it.

The cheapness of the chloride of aluminium, and its freedom from odour, render it favourable for hospital and private use.

AMMONIÆ ACETATIS LIQUOR.

SOLUTION OF ACETATE OF AMMONIA

Synonyms.—Spirit of Mindererus, Mindereus's Spirit.

Formula.—Old: $NH_4O,C_4H_3O_3$.
New: $\mathbf{NH_4C_2H_3O_2}$.

Characters.—A colourless liquid, with a faint acetous smell, and saltish ammoniacal taste. Should not alter the colour either of litmus or turmeric paper. It is entirely dissipated by heat.

Preparation.—By neutralising 10 ounces of acetic acid with carbonate of ammonia, and adding 2½ pints of water, gently warming the solution to expel the carbonic acid. It is also made by neutralising the acetic acid with the liquor ammoniæ fortior.

Physiological Effects and Therapeutics.—Diaphoretic, diuretic, and refrigerant; therefore useful in febrile and inflammatory diseases. Externally, in the proportion of 1 to 10 of water, or mixed with weak spirit, it forms a cooling lotion.

Dose.—From 10 to 40 minims, freely diluted.

AMMONIÆ CARBONAS.

CARBONATE OF AMMONIA.

Synonym.—Sesquicarbonate of Ammonia.

Formula.—Old: $2NH_4O,3CO_2$.
New: $\mathbf{N_4H_{18}C_3O_9}$, or $\mathbf{(NH_4)4H_2(CO_3)3}$.

Characters.—It occurs in translucent crystalline masses having a strong ammoniacal odour and an alkaline reaction. It is soluble in cold water, more sparingly so in spirit, and volatilizes entirely when subjected to heat.

Chemistry.—This substance is a mixture of neutral carbonate of ammonia—$(NH_4)2\,CO_3$—and two molecules of acid carbonate of ammonia—$2(NH_4)HCO_3$—which accords with the ultimate composition given in the *Formula*. The commercial salt (*salt of hartshorn*) consists of half-acid carbonate more or less mixed with ammonium carbonate.

Preparation.—By submitting a mixture of chloride or sulphate of ammonium and carbonate of lime to sublimation in a suitable apparatus.

Physiological Effects and Therapeutics.—Ant-acid, stimulant, sudorific, and expectorant. (Also see Ammoniæ Liq. Fort.)

Dose.—From 3 to 10 grains in water.

AMMONIÆ LIQUOR FORTIOR.

STRONG SOLUTION OF AMMONIA.

Ammoniacal Gas, NH_3, dissolved in water.

Characters.—A colourless liquid, with a characteristic and very pungent odour, and strong alkaline reaction. It reddens turmeric paper, changes the colour of violet juice to green; but by exposure to the air, or the application of heat, both are restored to their original colour. Sp. gr., 0·891.

Preparation.—By heating a mixture of one part of powdered chloride of ammonium (hydrochlorate of ammonia) and two parts of dry quick lime in a glass retort; the ammoniacal gas is conveyed into distilled water contained in Woulff's bottles under some pressure, until the liquid has the strength indicated by the tests.

Physiological Effects and Therapeutics.—Its local action is at first rubefacient, then vesicant, and lastly caustic or corrosive. Its emanations are irritant. In syncope its effects are of an immediately restorative character; but it should be used cautiously. Internally, in small doses it acts as a diffusible stimulant or calefacient.

The effect of ammonia is principally manifested in the ganglionic and spinal systems, while camphor, wine, and opium affect the cerebral system; thus ammonia is adapted for speedily arousing the action of the vascular and respiratory systems, and for the prompt alleviation of spasm. More especially is this remedy indicated when the object is at the same time to promote the action of the skin.

The form in which ammonia is internally administered is usually the carbonate, or the aromatic spirit of ammonia.

Dose.—Of carbonate of ammonia, 3 to 10 grains in water; aromatic spirits of ammonia 10 to 60 drops in water.

AMMONIÆ VALERIANAS.

VALERIANATE OF AMMONIA.

Formula.—Old: $NH_4O,C_{10}H_9O_3$.
New: $\mathbf{NH_4C_5H_9O_2}$.

Characters.—The crystals, and also the hydrated liquid salt, have a peculiar odour, and sweetish taste, soluble in alcohol, or water, very deliquescent.

Preparation.—Formed by saturating Valerianic acid with strong solution of ammonia, and evaporating at a temperature below 150°F. to a syrupy consistence. It has also been prepared by the action of dry gaseous ammonia on the monohydrated acid at a low temperature. It may be obtained in the crystalline form by the spontaneous evaporation of an alcoholic solution. It is generally sold in the form of a concentrated solution.

Physiological Effects and Therapeutics.—Stimulant, antispasmodic and nervine tonic. Valerian excites the cerebro-spinal system; its operation on the nervous system is also accompanied with its occasional therapeutic influence over certain morbid states, whence it has been denominated nervine and antispasmodic. The stimulant influence of the valerian is greatly increased by ammonia, and the ammoniated tincture is a more certain preparation. In neuralgia, particularly when associated with hysteria, it sometimes exercises a favourable influence.

Dose.—½ to 4 grs.; the dose may be increased till nausea is produced. Of the ammoniated tincture, ½ to 1 drachm.

AMMONII CHLORIDUM.

CHLORIDE OF AMMONIUM.

Synonyms.—Muriate of Ammonia, Hydrochlorate of Ammonia, Sal Ammoniac.

Formula.—Old: NH HCl. New: NH_4Cl.

Characters.—In colourless, inodorous, translucent, fibrous masses, tough and difficult to powder, soluble in water and in rectified spirit.

Preparation.—Formed by neutralising hydrochloric acid with ammonia, and evaporating to dryness. Also by treating the impure ammoniacal liquor of gasworks with hydrochloric acid; or by first treating the ammoniacal liquor with sulphuric acid, then mixing the resulting sulphate with common salt, and subliming.

It may be obtained in a fine state of division by dissolving the salt in boiling water to saturation, and evaporating the solution to dryness over a water bath, constantly stirring during the process.

Physiological Effects and Therapeutics.—A powerful alterative and stimulant to the absorbents; it increases considerably the secretion from the mucous membrane; it restores secretions and exhalations which have been arrested by inflammation, and also improves their quality. It is useful in certain glandular affections, in chronic periostitis, rheumatism, and neuralgia. Many employ this salt in all forms of neuralgia, and some go so far as to assert that in this painful affection they require no new remedy, since chloride of ammonium so rarely fails. Externally, it is used as a discutient. It has also been recommended as a useful ingredient in gargles and dentifrices for whitening the teeth.

Uses.—It is used in the laboratory to "clean" zinc which has become unworkable.

Dose.—For internal use the dose is from 5 to 30 grains, every two to four hours. As a lotion, from 2 drachms to 1 ounce of the salt to 10 ounces of water.

AMMONII IODIDUM.

IODIDE OF AMMONIUM.

Formula.—Old: NH_4I. New: $\mathbf{NH_4I}$.

Characters. — An extremely deliquescent, colourless salt, crystallizing in cubes, readily soluble in water and alcohol, and on exposure to the air the solution assumes a yellow colour. When heated out of contact with air, it volatilizes without decomposition; but if access of air be allowed, it is coloured yellow, from excess of iodine.

Preparation.—A solution of hydriodic acid is neutralised by carbonate or solution of ammonia, filtered and carefully evaporated to crystallisation.

Physiological Effects and Therapeutics. — Similar in action to iodide of potassium, but more active. A solution of 30 or 40 grains in a fluid ounce of glycerine has been used as a local application in enlarged tonsils and glands.

Dose.—2 to 5 grains three times a day.

AMYLENE.

AMYLENE.

Formula.—$\mathbf{C_5H_{10}}$.

Characters.—A colourless, mobile liquid, possessing a peculiar unpleasant odour resembling that of decaying cabbages. It boils 102·2°F., and when ignited burns with a bright, very smoky flame.

Preparation.—By submitting amyl alcohol to distillation with chloride of lime, and subsequently purifying; or, by decomposing chloride of amyl by fusion with caustic potash.

Physiological Effects and Therapeutics.—Introduced as an anæsthetic, in 1856, by the late Dr. Snow. It was considered by him to possess the following advantages over chloroform and ether:—1. The greater ease with which it could be breathed, owing to the entire absence of pungent and irritating properties. 2. The greater readiness with which absence of pain is obtained, with less profound coma than usually accompanies chloroform or ether. 3. The greater promptitude with which patients recover from its effects. 4. The greater infrequency of vomiting. 5. The less amount of rigidity and struggling during its operation; and 6. The small amount of headache which results from its use.

Other practitioners have not formed so high an estimate of the value or safety of Amylene as Dr. Snow.

AMYLUM TRITICI.

WHEAT STARCH.

Formula.—Old: $C_{12}H_{10}O_{10}$. New: $C_6H_{10}O_5$.

Botany.—Obtained from Triticum Vulgare belonging to the Natural Order *Graminaceæ* —the Grass order.

Preparation.—Coarsely ground wheat is steeped in water and allowed to ferment; the mass is then washed upon a sieve, the starch passing through is collected, well washed with water, and dried at a very gentle heat.

Uses.—It is a cooling application to external inflammations. In the form of decoction or infusion, it is employed to thicken bandages for fractures of the jaw, &c.

The Glycerine of Starch is a valuable vehicle for the application of Aconite, Atropia, and other powerful agents.

AMYL HYDRIDE.

HYDRIDE OF AMYL.

Synonym.—Quintane.

Formula.—$C_5H_{11}H$ or C_5H_{12}.

Characters.—A colourless, very volatile and inflammable liquid; when pure it has a very faint odour, and boils at 86°F. Sp.gr. 0·625. It gives no oiliness to the touch, and is absolutely innocuous when applied to the skin or mucous membrane.

Preparation.—May be prepared sufficiently pure for most medicinal purposes by fractional distillation of American petroleum.

Physiological Effects and Therapeutics.—According to Dr. Richardson its extreme volatility renders it a useful agent for the production of local insensibility. For mere punctures or slight incisions, the simple hydride, in the form of spray, rapidly produces the effect needed; but when comparatively large surfaces have to be deadened, the hydride should be diluted with absolute ether (one part hydride and 4 parts ether); the best agent for the rapid production of local insensibility is thus secured. As it dissolves camphor, spermaceti, iodine, &c., and is miscible with ammonia, vegetable and animal oils, it is likely to prove a useful agent with other medical remedies. It gives less pain than ether when applied to a cut or abraded surface; and in operations upon the teeth its action is much better than the best ether used alone. It may be used in the mouth as spray with perfect safety, having no quality that needs to be feared. Once or twice during operations on the mouth, and when the compound vapour given off from the spray was unavoidably inhaled freely, there was produced general insensibility, but this was rather favourable than otherwise to the operative procedure.

In conjunction with iodine it is a useful application to wounds, &c., and for inhalation in ulceration of the throat, &c. Paper soaked in the solution, dried and exposed, or burnt, purifies the air of sick rooms.

AMYL NITRIS.

NITRITE OF AMYL.

Formula.—Old: $C_{10}H_{11}O, NO_3$.
New: $C_5H_{11}NO_2$.

Characters.—An ethereal liquid of a yellowish colour, and peculiar but not disagreeable odour. Sp. gr. 0·877. Boiling point 205°. Insoluble in water; soluble in rectified spirit in all proportions.

Preparation.—Produced by the action of nitric or nitrous acid on amylic alcohol.

Physiological Effects and Therapeutics.—Anodyne, useful in asthma, nervous headache, and sea-sickness, and also in angina pectoris. It is a restorative in cases of defective breathing, and weakness of the heart's action. Most beneficial in cases of profound, prolonged, and apparently fatal *syncope*, whether arising from chloroform or other causes. If breathing has ceased, artificial respiration should be resorted to as a means to effect its entrance into the lungs. It is believed that Nitrite of Amyl acts as an antidote to chloroform by producing a direct paralysis of the vascular walls, hence causing a rapid circulation. By dilating the peripheral arterioles, this agent is also beneficial in those ailments which depend upon increased arterial tension—as in angina pectoris, and in some forms of neuralgic headache, &c.

It is useful in neuralgia, particularly of the fifth pair, often easing the pain at once. In thirty or forty seconds, whether inhaled, subcutaneously injected, or swallowed, it flushes the face, and increases the heat and perspiration of the head, face, and neck; therefore neuralgia arising from anæmia is strikingly relieved by it. Dr. Ringer says, "To Dr. Brunton belongs the credit of first using this remedy, and the rare merit of inferring correctly its therapeutic effect from its physiological action. It must give him the highest satisfaction to know how great a boon his scientific insight has provided for the hitherto almost helpless patients under the anguish of angina pectoris."

Nitrite of Amyl is generally considered a powerful and even dangerous remedy; it is better administered by inhalation, and at first in very small doses. Nervous and sensitive women are far more powerfully affected by it than men.

Dose.—By inhalation, the vapour of 2 to 5 minims. To be used with caution.

ANTHEMIS NOBILIS.

COMMON CHAMOMILE.

Botany.—An indigenous plant belonging to the Natural Order *Compositæ*—the Composite order. The dried single and double flower heads are used; the former, however, are to be preferred (when they can be obtained), as they contain the greatest quantity of volatile oil.

Physiological Effects and Therapeutics. — Tonic and stomachic. The warm infusion in large doses acts as an emetic; as a fomentation it is little better than hot water. Flannel bags filled with chamomile flowers, and soaked in hot water, are useful topical agents for the application of moist warmth, on account of their retention of heat.

AQUA DESTILLATA.

DISTILLED WATER.

Formula.—Old: HO. New: H_2O.

Characters.—Pure water may be regarded as a neutral body. It reacts neither as an acid nor as an alkali or basic body. This is not the case with ordinary water, therefore, pure or distilled water ought always to be used for medicinal and scientific purposes.

Preparation. — Distillation, when properly conducted, is the most effectual method of purifying water.

ARECA CATECHU.

CATECHU, OR BETEL NUT PALM.

Botany.—The Betel nut tree belonging to the Natural Order *Palmaceæ*—the Palm order. Found in the south of India. Its seeds are known as Betel, Areca, and Pinang nuts.

Properties and Uses.—In its properties and uses it resembles the catechu obtained from acacia catechu. Charcoal prepared from the areca nut is termed areca-nut charcoal, and is used in this country as a tooth powder. It is doubtful if it possess any advantage over that of ordinary charcoal.

The betel nut is one of the ingredients in the famed masticatory of the East called *Betel.*

ARGENTI NITRAS.

NITRATE OF SILVER.

Synonym.—Lunar Caustic.

Formula.—Old: AgO, NO_5. New: $AgNO_3$.

Preparation.—Prepared by dissolving silver in nitric acid and distilled water, evaporating the solution and setting aside to crystallise. The *stick* or *lunar caustic* is prepared by fusing the crystallized nitrate, and pouring into moulds. Light should be carefully excluded as it decomposes the salt.

Physiological Effects and Therapeutics.—The local action is that of a caustic or corrosive. Applied to the skin it produces at first a white mark, owing to its union with the albumen of the cuticle, this gradually becomes bluish-grey, purple, and ultimately black, owing to the partial reduction of the silver.

Repeated applications, with moisture, produce, after some hours, vesication, usually with less pain than that attendant on the use of cantharides.

It is sometimes employed as an internal remedy; but as it causes discolouration of the skin, which is generally permanent, it is rarely resorted to. As a topical agent its uses are far more valuable. In inflammatory affections and ulcerations of the mucous membrane of the mouth and fauces, it is particularly so, the strength varying from 1 to 60 grains to a fluid ounce of distilled water.

It has also been used with advantage as an injection (1 to 5 grains to 1 ounce of distilled water) in some abnormal conditions of the maxillary sinuses, and in fistula.

As a styptic it is not so reliable as the preparations of iron or tannic acid, the coagulum which is formed being soluble in excess of albumen, while that formed by iron or tannic acid is not.

It has been suggested as an application to an exposed dental pulp, and to sensitive dentine; either in the solid form, or a saturated solution, it is used to obtund the sensitiveness of abraded teeth; but chloride of zinc in the solid form is far better, as it does not cause discolouration of the teeth.

Fused upon a platinum wire, it may be applied with greater facility and safety to the cavities of teeth or in awkward positions, where fracture of the stick caustic might be dangerous.

Recent stains of the cuticle may be removed by washing with a solution of common salt, followed by a solution of ammonia; and also stains of long standing by wetting them with tincture of iodine, and subsequently with cyanide of potassium.

Should the pain produced by its external use be excessive, it can be allayed by washing the part with solution of common salt.

Antidote.—Solution of common salt, forming an insoluble chloride.

ARNICA MONTANA.

MOUNTAIN ARNICA.

Synonym.—Leopard's Bane.

Botany.—A plant belonging to the Natural Order *Composite*—the Composite order. Found in the meadows of the cooler parts of Europe, from the sea shore to the limits of perpetual snow; also in the northern parts of America and Asia. Beside the root, the dried flowers are employed in medicine, and are commonly preferred.

Chemistry.—The properties of arnica appear to depend upon an acrid resin, modified by a volatile oil and extractive. The best solvent is rectified spirit. According to Mr. Bastick it contains an alkaloid which he has named *Arnicina.*

Physiological Effects and Therapeutics.—Nervine, stimulant and diaphoretic. Externally, either in the form of tincture as a liniment, or diluted as a lotion. It is applied as a sedative and a resolvent to glandular swellings and rheumatism. To bruises, sprains, and lacerations it is extensively employed, and in most cases is very effectual. It is necessary to watch its effects when thus used, as a very troublesome eruption is apt to result when too long persevered in. The tincture in conjunction with tannic acid or glycerine of tannin, is a most useful application to ulcers of the mouth caused by artificial dentures.

ARSENIOSUM OXIDUM.

ARSENIOUS OXIDE.

Synonyms.—Arsenious acid.—White arsenic.

Formula.—Old: AsO_3. New: As_2O_3.

Characters.—A whitish shapeless and glass-like mass, by age becoming crystalline and china-like; inodorous and almost tasteless; hardly soluble in water or alcohol, more readily in acids and alkaline fluids, creasote and most ethereal oils. It is strongly poisonous.

Heated with charcoal it forms metallic arsenic giving out an alliaceous odour. When mixed with zinc, and either sulphuric or hydrochloric acid, it evolves arseniuretted hydrogen gas, which has an alliaceous odour, and burns with a bluish-white flame, depositing a black spot of metallic arsenic on a *cold* plate held directly in the jet (*Marsh's Test*). When boiled with hydrochloric acid and clean copper foil, it gives a grey metallic coating of arsenic to the latter. By heating the metal in a test tube the arsenic is expelled (*Reinsch's Test*).

Preparation.—By roasting the ores of cobalt, tin, and iron, the arsenious oxide vapours are condensed in a pulverulent form in the flues or condensing chambers. This rough oxide is refined by resublimation, and forms the white arsenic of commerce.

Physiological Effects and Therapeutics.—Arsenious oxide is an antiperiodic, alterative, and antispasmodic; also an escharotic and antiseptic. Chronic affections of the nervous and cutaneous systems are benefited by its use. In chorea, arsenious oxide is a remedy of established value. In cancrum oris and malignant ulcers of the tongue, its internal use is stated to be highly efficacious. Neuralgia, especially of the fifth and intercostal nerves, depending upon debility, has been advantageously treated by this remedy.

It is employed to devitalize the dental pulp, and also to obtund the pain of sensitive dentine. For this purpose it is usually combined with acetate of morphia and carbolic acid, in the form of paste; a small portion of which is introduced into the carious tooth and kept *in situ* by cotton and mastic, or some other agent. The quantity inserted should be about the twentieth or twenty-fourth part of a grain of arsenic, and it should be allowed to remain in the tooth from two to thirty-six hours, according to the effect desired to be produced.

As the result of experiments Dr. Arkövy ascertained that arsenious acid, when brought into contact with the tooth pulp, produces hyperæmia, which varies according to the quantity of the agent applied; the blood-vessels become dilated and have a tendency to thrombosis. It has a specific effect upon the blood corpuscles, combining with the hæmoglobin, but produces no coagulation of tissue. The connective fibres and odontoblasts undergo no change whatever, but the connective tissue cells increase in size. The axis cylinder of the nerve elements here and there disappear. The whole or certain parts of the pulp, as well as the neighbouring dentine and cementum, assume a brownish red tinge. The arsenious acid is liable to permeate the dentine and cementum when thin, and also to be taken up in the collateral circulation, and produce periostitis; hence the necessity of not allowing this powerful and toxic agent to remain *in situ* longer than twenty-four or thirty-six hours, and also of the entire extirpation of pulp so destroyed. The larger the pulp (as in young teeth), the greater the liability to periostitis ensuing. Neither should the escharotic be applied where there is acute inflammation of the pulp; but that condition should first be allayed by means of carbolic acid, morphia, aconite, &c.

In 1879 Binz and Schultz made experiments with arsenic, the results of which are supposed to show that, when incorporated into the organism, arsenious acid changes into arsenic acid, and *vice versâ*. Both changes are effected by the protoplasmic tissue, and arise from the oscillation of the oxygen atoms of the albumen molecules; the quantity of these atoms deciding as to the therapeutic or toxic action of arsenic.

Mr. Coleman recommends arsenious acid as an antiseptic, preventing or correcting the decomposition of the contents of the dentinal tubes and lacunal canaliculi. That arsenic so applied could reach so far as to affect the periosteum of the tooth so treated, he is very disinclined to believe, for he has used it in hundreds of cases to cure periodontitis, and has saved the teeth.

Mr. C. S. Tomes, on the other hand, is inclined to think that in some instances the arsenic may have destroyed not only the pulp, but have reached the protoplasmic network of the cementum.

Dose.—Of arsenious acid $\frac{1}{60}$ to $\frac{1}{12}$ of a grain.

Antidotes.—Lime water, hydrated magnesia, hydrated sesquioxide of iron, animal charcoal, milk, raw eggs, emetics. (Also, ℞ Tincturæ Ferri Perchloridi ʒj, Sodæ vel Potassæ Bicarbonatis ℥j, Aquæ Fervens ℥iv. Misce.)

ATROPA BELLADONNA.

BELLADONNA.

Synonyms.—Deadly-nightshade—Dwale.

Botany.—This plant is a member of the Natural Order *Atropaceæ*—the Deadly-nightshade order. Indigenous, and found in shady places on calcareous soils. It is also cultivated for the sake of its leaves and flowering tops, from which an extract and a tincture are made. The roots are imported from Germany, and are employed for making the liniment, and extracting the alkaloid.

Chemistry.—The alkaloid is termed *atropia* or *atropine.*

Physiological Effects and Therapeutics.—Belladonna in the first degree, diminishes sensibility and irritability where these are morbidly increased, and, very frequently, causes dryness of the mouth and throat, with thirst. In the second degree of its operation, both in the healthy, and morbid conditions, it has a remarkable influence over the cerebrospinal system.

In comparing the operation of belladonna with that of other cerebro-spinants or narcotics, the more remarkable symptoms which attract attention are dilatation of the pupil, with insensibility of the iris to the action of the light, disturbance of vision, giddiness, staggering, delirium, with phantasms followed by sopor, dryness of the throat, and difficulty of deglutition and articulation. Convulsions are rare, and when they occur, are slight. Lethargy or sopor occurs subsequently to the delirium. These characters distinguish the effects of belladonna from that of any other medicinal substance, except henbane and stramonium.

Belladonna has been applied to allay pain and nervous irritability, to lessen rigidity and spasmodic contraction of muscular fibres.

Dr. Thorogood says "Belladonna and quinine are two valuable remedies, more universally trustworthy than any I am acquainted with for the cure of facial neuralgia. I have seen the pain due to an inflammation in the socket of a tooth, which came on suddenly and with great severity, subside quickly and permanently after the use, three times daily, of a pill containing 2 grains of sulphate of quinine and $\frac{1}{2}$ grain of extract of belladonna. On a previous occasion when the pill was not employed, the pain was so severe that it was only by a hypodermic injection of acetate of morphia that ease was obtained." The belladonna appears to reduce local congestion, and may follow well on a few doses of chloride of ammonium as a preparatory medicine.

As an anodyne in most cases of internal pains, no remedy hitherto proposed is equal to opium, but this agent totally fails in many of those external pains known as tic douloureux and neuralgia. In such, belladonna occasionally succeeds in abating, sometimes in completely removing the pain.

In the treatment of neuralgia this remedy is regarded by some as less efficacious than aconite. It is useful during pregnancy in diminishing the excessive salivary secretion. In profuse salivation it has been found highly beneficial.

Dose.—Of the tincture, 5 to 30 minims.

Antidote.—Opium is the natural antidote; while atropine is an antidote to aconite.

BEBERIÆ SULPHAS.

SULPHATE OF BEBERIA.

Formula.—Old: $C_{35}H_{20}NO_6, HOSO_3$
New: $C_{35}H_{40}N_2O_6, H_2SO_4$.

Botany.—Obtained from the bark of the Bebeeru-tree, Nectandra Rodiæi, the Greenheart-tree, belonging to the Natural Order *Lauraceæ*—the Laurel order,—found in British Guiana.

Characters.—In thin, dark brown, translucent scales forming a yellow powder, entirely destructible by heat. Soluble in water and alcohol, the solution having a strong bitter taste.

Preparation.—The alkaloid *Beberia* or *Beberine* is extracted by exhausting the bark with dilute sulphuric acid, concentrating and removing the greater part of the acid by lime, precipitating the alkaloid by ammonia, dissolving out the Beberia with alcohol, distilling off the spirit and neutralizing the residue with dilute sulphuric acid; and, lastly, evaporating to dryness, dissolving in water, evaporating to the consistence of a syrup, and scaling on glass plates at a temperature of 140°F.

Physiological Effects and Therapeutics. — Tonic and antiperiodic. It is said not to produce headache or cerebral disturbance, and therefore preferable to quinine in plethoric subjects. Its febrifuge properties are far inferior to those of quinine. It is well suited for the treatment of general debility, and atonic conditions of the alimentary mucous membrane; for it rarely or never produces headache or nausea, as is often the case with quinine. In neuralgia, tic douloureux, and in the periodical neuralgia of pregnancy, Dr. Maclagan found it eminently successful, even in cases in which quinine had previously failed. Its efficacy in this class of cases has been attested by Sir J. Y. Simpson, Dr. Macfarlane, and others.

Dose.—Tonic, 1 to 3 grains; Antiperiodic, 5 to 10 grains.

BISMUTHI ET AMMONIÆ CITRAS (LIQUOR).

SOLUTION OF CITRATE OF BISMUTH AND AMMONIA.

Characters.—The solution is colourless, neutral, or slightly alkaline to test paper, and mixes with water without change. It has a saline and slightly metallic taste. Sp. gr. is 1·122. Each fluid drachm contains three grains of oxide of bismuth.

Preparation.—By dissolving 430 grains of bismuth in dilute nitric acid, the effervescence having ceased, heating to near the boiling point for about ten minutes, then decanting the liquid, evaporating to the bulk of two fluid ounces, and adding a solution of citric acid, and afterwards solution of ammonia, in small quantities at a time, until the precipitate formed is re-dissolved, and the solution neutral or slightly alkaline to test paper. Lastly, diluting with distilled water to the volume of one pint.

Physiological Effects and Therapeutics.—The advantages of this preparation are derived from the fact that the metal is in a state of perfect solution. It mixes with water and other fluids without precipitation. Dr. Martyn, of Bristol, has stated that he has found it act better than the older preparations. It allays pain in acute irritability of the stomach (without nausea or much acidity), especially that which remains after ulceration. Its therapeutic action is the same as the subnitrate of bismuth.

Dose.—½ to 1 drachm.

BISMUTHI SUBNITRAS.

SUBNITRATE OF BISMUTH.

Synonym.—Oxynitrate of Bismuth.

Formula.—Old: BiO_3NO_5, 2HO.
New: $BiONO_3H_2O$.

Characters.—A heavy white powder in minute crystalline scales.

Preparation.—By pouring a concentrated solution of nitrate of bismuth into water; washing, collecting, and drying the resulting precipitate at a temperature not exceeding 150° F.

Physiological Effects and Therapeutics.—An astringent, sedative and alterative. In consequence of the frequent relief given by it in painful affections of the stomach, it is supposed to act on the nerves of this viscus as a sedative.

In diseases of the stomach it is a remedy of established value. It has been particularly recommended to relieve gastrodynia and cramp of the stomach, to allay sickness and pyrosis or water brash.

In chronic laryngitis MM. Trousseau and Belloc speak highly of the efficacy of the local application of the subnitrate, by means of insufflation.

In a sore erythematous condition of the tongue, met with in chronic diseases, Dr. Symonds advises its use, in conjunction with glycerine and elder flower water, as a mouthwash.

Dr. Ferrier has recommended its use as a snuff in nasal catarrh.

Its continued administration, Dr. Brunton observes, frequently gives rise to the formation of a bluish-red hue along the dental edge of the gums, analogous to, but wider and redder than that resulting from the use of lead.

Dose.—5 to 20 grains.

BISMUTHUM.

BISMUTH.

Formula.—Bi.

History.—Found, native and in combination with sulphur and oxygen, in Cornwall, Saxony, Bohemia, and the United States.

Characters.—A reddish-white metal, composed of brilliant broad plates, and readily crystallizable in cubes or regular octahedrons; moderately hard, brittle, pulverizable; fusible at 476° F.

Use.—Used in the laboratory for metal dies.

BOLUS ARMENIÆ.

ARMENIAN BOLE.

History.—Several argillaceous and calcareous minerals were formerly used in medicine under the name of Bolus or Bole, which differed more or less from each other in colour and composition. They were termed white, red, and yellow, and were obtained from Armenia and other localities. That now sold is artificial, and is said to be prepared by mixing together common chalk and Oxide of Iron or Red Ochre.

Use.—It is often used as an adjunct to Tooth Powders, but, as it is usually rather gritty, preference should be given to prepared chalk, and, where a colouring agent is desired, a little rose pink, or carmine, may be added.

BROMUM.

BROMINE. = BR.

Formula.—**Br.**

History.—A non-metallic element chiefly found in sea water, and a frequent constituent of saline springs, chiefly as Bromide of Magnesium. Its name is derived from the Greek *Brōmos*, a noisome smell.

Characters.—A very volatile, dark brownish-red liquid, having a very strong and disagreeable odour, bearing some resemblance to that of iodine, but much more offensive, and more irritating, if possible, than that of chlorine. At the ordinary temperature of the air it evolves red vapours, and boils at 117° F. It is slightly soluble in water, more so in alcohol, and most freely in ether. Its Sp. gr. is 2·966.

Preparation.—The less soluble salts are crystallized out from sea water, leaving the Bromides in solution. The mother liquor is then treated with chlorine to liberate the Bromine, and shaken with ether, which dissolves the bromine, and, on standing, the ethereal solution separates, and may be removed by means of a funnel or pipette. It is then heated with a slight excess of caustic potash, when bromide and bromate of potassium are formed. This is evaporated to dryness, then heated to redness to convert the bromate of potassium into bromide; and, lastly, distilled with binoxide of manganese and sulphuric acid, when the bromine is volatilized in deep red vapours, and condenses into drops beneath the water in the receiver.

Physiological Effects and Therapeutics.—In its pure state Bromine is caustic and irritant. When properly diluted, and in small doses, it is tonic, diuretic, and resolvent, and increases the activity of the lymphatic system. When taken in long-continued doses, bromine and its compounds are apt, in some constitutions, to induce a train of symptoms to which the term *Bromism* has been applied. Dr. Glover regards bromine as intermediate in medicinal action between iodine and chlorine, but nearer to that of chlorine. In scrofula, scrofulous enlargements, and scrofulous ulcers, he considers it superior in efficacy to iodine. Bromine has been used as a disinfectant. (See Potassi Bromidum.)

Dose.—Of the Bromide of Potassium 5 to 15 grains, or more. Also given in the form of Ammonii Bromidum.

BUTYL CHLORAL HYDRATE.

CROTON CHLORAL HYDRATE.

Formula.—$C_4H_5Cl_3O, H_2O$.

Characters.—Is a white crystalline powder, slightly soluble in cold water, more so in glycerine, and in alcohol and ether.

Chemistry.—Messrs. Krämer and Pinner, in the course of their researches on the substance commonly called Croton Chloral, have ascertained that it contains two more atoms of hydrogen than was supposed, and that it is, in fact, butyl chloral.

It bears no relation whatever to croton oil, although its chemical constitution proves it to be the chlorated aldehyde of crotonic acid.

Preparation.—Made by passing chlorine gas through allylene (C_3H_4).

Physiological Effects and Therapeutics.—Dr. Althaus has drawn attention to the value of this medicine in neuralgia of the fifth nerve. Dr. Thorogood says the brain may be narcotized by the croton chloral hydrate without the rest of the nervous system being affected. Butyl Chloral, in moderate doses of 5 grains, has a special sedative action upon the fifth nerve. In larger doses of 15 grains it acts as a hypnotic and causes sleep. In cases where the neuralgic pain is paroxysmal—mostly at night—and often connected with dental caries, 5 or 10 grains, dissolved in warm water, may be given at bed-time. In anæmic persons, the Butyl chloral is often very successful. It is easily soluble.

Its vapour powerfully attacks the mucous membranes and the eyes.

Dr. J. W. Legg gives the results of his observations on the action of this compound upon twenty patients at St. Bartholomew's

Hospital, to whom he administered it for affections of the head and face :—"Should the Croton Chloral be as efficient in the hands of others as it has been in mine, it will prove an important addition to the Materia Medica. It will enable the physician to give relief from pain till relief can be afforded by the dentist, or by attention to the general health, and this without the general effects of narcotics."

The action of this anæsthetic first begins in the head and face, and is complete before any trace of narcosis manifests itself; in other words, its practical value lies in its property of diminishing sensibility before producing narcosis.

It does not depress the heart's action like chloral hydrate, and therefore is indicated in cases of cardiac disease where the use of the latter remedy is unsafe.

Dose.—Three to ten grains. As an anæsthetic, fifteen to thirty grains.

CALCIS CARBONAS PRÆCIPITATA.

PRECIPITATED CARBONATE OF LIME.

Synonym.—Precipitated chalk.

Formula.—Old : CaO,CO_2 New : **$CaCO_3$**.

Preparation.—Dissolve chloride of calcium and carbonate of soda in water; mix the solutions, and allow the precipitate to subside; collect this on a calico filter; wash it with boiling distilled water, until the washings cease to give a precipitate with nitrate of silver, and dry the product at a temperature of 212° F.

Physiological Effects and Therapeutics.—It is good for obtunding the sensitiveness of dentine, its application for a few days greatly facilitates the excavation of the cavity. It is an antidote for oxalic acid.

Uses.—This agent forms the basis of most tooth powders. It is also employed for polishing fillings, artificial plates, &c.

CALCIS HYPOPHOSPHIS.

HYPOPHOSPHITE OF LIME.

Formula.—Old: $CaO,P.HO_3$.
New: $\mathbf{Ca\ 2PH_2O_2}$.

Characters.—Colourless crystals, which have a pearly lustre and bitter taste; soluble in about six parts of water.

Preparation.—Obtained by heating phosphorus with hydrate of lime and water, until phosphuretted hydrogen gas ceases to be evolved, then filtering the liquid, and separating the uncombined lime by means of carbonic acid gas; lastly, evaporating the solution in vacuo over sulphuric acid, until the salt separates by crystallisation.

Physiological Effects and Therapeutics.—The hypophosphites of lime, potash, and soda, are the principal alkaline hypophosphites which have of late years been introduced into medical practice, and as they are closely allied in medicinal properties and uses, they may be conveniently considered together.

They were introduced by Dr. Churchill, and are reputed to be tonic, alterative-stimulant, and nerve stimulant. They are used in cases of general debility, especially where the phosphates are deficient, as they increase the nerve force, and are the most powerful of hæmatogens, possessing all the therapeutic properties of phosphorus.

According to Mr. Taylor, who has carefully examined the properties of those salts, the soda hypophosphite is best adapted for blood diseases ; and those of potash, lime and ammonia for diseases of the secretory organs. Their assimilation is promoted by sugar.

In cases of nervous depression with neuralgic pains, the hypophosphites prove useful, and the lime or the soda salt may be given, according as the stomach bears the one better than the other.

When anæmia is present, the citrate of iron may be added to the soda salt, or else the syrup of hypophosphite of iron, or of iron and quinine. Either of these syrups will prove an active tonic, removing neuralgic pains, and languor of circulation in a very evident way.

In all cases, where there is reason to suppose the phosphates to be morbidly deficient, they may be prescribed with a good prospect of success. The demand for phosphate of lime in the construction of the teeth, contributes to the disturbing influences called the fever of dentition. In these cases, whether they occur in weakly ill-fed children, or in the robust, the hypophosphites have been employed with marked success: In the former class combined with some tonic or aromatic tincture; in the latter with acetate of ammonia, or syrup of rhubarb. (See Potassæ, Quiniæ, and Sodæ Hypophosphis.)

Dose.—5 to 10 grains.

CALCIS SULPHAS.

SULPHATE OF LIME.

Synonyms.—Sulphate of Calcium, Plaster of Paris, Gypsum.

Formula.—Old: CaO,SO_3. New: $CaSO_4$.

Characters. — Native crystalline sulphate, containing two molecules of water, is found in considerable abundance in some localities as *Gypsum*, and when regularly crystallised it is termed *Selenite.* It is usually met with in the form of a white powder, possessing a great affinity for water, with which it combines forming a hydrate. It is soluble in about 500 parts of cold water.

Preparation—Gypsum is exposed to heat in an oven where the temperature does not exceed about 260°F., by which the water of crystallization is expelled; it is then reduced to a fine powder, known as plaster of Paris. Sulphate of Lime can be formed artificially by adding sulphuric acid to a moderately concentrated solution of chloride of calcium.

Uses.—For taking impressions of the mouth, and making casts from the same, &c. That it may be perfectly smooth and free from lumps, the plaster should be put to the water, and any excess there may be poured off.

CALCIS SULPHIDUM.

SULPHIDE OF CALCIUM.

Synonyms.—Monosulphide of calcium, Canton's phosphorus.

Formula—**CaS.**

Characters.—A pale, brownish-white amorphous powder, with hepatic taste and alkaline reaction; sparingly soluble in water, in which it slowly decomposes, evolving sulphuretted hydrogen. Exposed to the air, more especially damp air, it absorbs oxygen. When very freshly prepared, it is phosphorescent, hence its old name, *Canton's Phosphorus.*

Preparation.—It is commercially made by the action of charcoal, coal, or suitable carbonaceous matter (some manufacturers use wheaten flour), upon sulphate of calcium at a red heat. The oxygen of the sulphate is carried off as carbonic anhydryde (carbonic acid) and carbonic oxide, leaving CaS.

Physiological Effects and Therapeutics.—The effect of the sulphides on the blood, after absorption into that fluid, is at present unascertained. In small doses they excite a sensation of warmth at the epigastrium, and act as slight irritants to the intestines, and determine gentle relaxation of the bowels; but in excessive doses they produce active inflammation in the digestive canal, and even produce insensibility and death.

According to Dr. Ringer, the sulphides appear to possess the property of arresting suppuration; thus, in inflammation threatening to end in suppuration, they reduce the inflammation and avert the formation of pus. It may be urged that it is difficult to imagine how these remedies can produce effects so different and apparently opposite as the dispersion of inflammation in one case, and the expulsion of pus in another ; poultices, however, and hot fomentations both subdue inflammation and prevent suppuration, and in other cases considerably hasten the evacuation of pus. In periostitis and alveolar abscess the author (J. S.) has found the Sulphide of Calcium of great service. The good effects are conspicuous in certain scrofulous sores not uncommonly seen in children. In suppuration of scrofulous glands in the neck, the sulphides appear, says Dr. Ringer, to exercise a very beneficial influence by hastening the elimination of the pus and improving its condition. In these scrofulous affections the drug may have to be administered for a long period.

The formula adopted by Dr. Ringer, is one grain of Sulphide of Calcium to half a pint of water—a child taking of this mixture a teaspoonful hourly. It is essential that the medicine in this form should be compounded daily. It is better given in the form of powders or varnished pills—the latter are elegantly prepared by Mr. Martindale, of New Cavendish Street, W.

Dose.—For an adult, from $\frac{1}{10}$ to $\frac{1}{2}$ grain hourly, or every second or third hour, as the case may be.

CALENDULA OFFICINALIS.

COMMON OR POT MARIGOLD.

Botany.--An annual belonging to the Natural Order *Compositæ*—the Composite order, sub-order *Corymbiferæ.* The herb is common in gardens, and sometimes met with growing apparently wild, but it is not strictly indigenous.

Characters.—It has a peculiar, rather disagreeable odour, which is lost by drying, and a rough, bitter, saline taste; it contains a bitter principle, called *Calendulin;* discovered by Geiger, and considered by Berzelius as analogous to *Bassorin*, though soluble in alcohol.

Physiological Effects and Therapeutics.—Slightly stimulant and diaphoretic. It has been reputed useful in spasmodic affections, strumous maladies, in low forms of fever, &c. The leaves and flowers are generally used, and impart their active properties to alcohol and boiling water. Dr. Ab. Livezey, of Philadelphia, is said to have used a strong tincture of the flowers as an application to incised and lacerated wounds and contusions, and found it exercise a peculiar curative influence, preventing inflammation and suppuration, and promoting the healing of the wounds when the parts were brought into contact. Dr. W. J. Clary, of Monroville, Ohio, writes: "As a local remedy, after surgical operations, it has no equal in the Materia Medica." Its *forte* is its influence on lacerated wounds, without regard to the general health of the patient. If applied constantly, gangrene will not follow, and there is little danger of tetanus supervening.

Dose.—Tincture, 1 to 2 drachms.

CALX.

LIME.

Synonym.—Oxide of calcium.

Formula.—**CaO.**

Preparation.—Obtained by calcining chalk or limestone so as to expel the carbonic acid.

Physiological Effects and Therapeutics.—Quicklime, like other fixed alkalies, is a powerful escharotic and irritant. Lime water, when applied to suppurating or mucous surfaces, checks or stops secretion and produces dryness of the parts; hence it is a desiccant. It is useful in sickness and irritability of the stomach during teething.

The power of exciting and changing the mode of action of the absorbent vessels and glands, has been ascribed to lime water, and probably with some foundation, for under its use glandular enlargements have become softer and smaller—in other words, it is a resolvent. It often relieves the superficial ulceration of the mucous membrane of the mouth observed in dyspepsia. In these cases one part of lime water to two or three of milk is usually sufficient. In some scrofulous ulcers its power of checking secretion is most marked. Lime with sugar is considerably more soluble in water than pure lime, and its solubility is greater in cold than in hot water.

Dose.—Of liquor calcis, ½ to 2 fluid ounces.

CALX CHLORATA.

CHLORINATED LIME.

Synonyms.—Chloride of Lime, Bleaching Powder, Hypochlorite of Lime.

Formula not yet accurately determined.

Characters. — A soft dull-white powder, which attracts moisture from the air, and possesses a peculiar odour resembling chlorine, yet sensibly differing from it. It is partially soluble in water, and is a valuable bleaching and disinfecting agent.

Preparation.—By subjecting slightly moist hydrate of lime to the action of chlorine until the latter is no longer absorbed.

Test.—To a solution of Indigo in a test-tube, add a small amount of chlorinated lime; to this add strong acid. The rapidity of the change of colour will indicate the relative amount of chlorine in combination with the lime. If there is very little change of colour, or the bleaching proceeds very slowly, the lime should be discarded as unfit for use.

Physiological Effects and Therapeutics.—Deodorizer, disinfectant, and antiseptic. These properties are largely due to the evolution of chlorine. Hypochlorous acid is evolved, and coming in contact with bacteria and other organic matter rapidly oxidises it, with the simultaneous liberation of chlorine. The evidence in favour of its power as a disinfectant is inconclusive. Some infected matters, when treated with this substance, lose their power to propagate disease; but it is impossible to subject objects or persons to such destructive action as is found to be required in these experiments. In doses of one to six grains, in solution, it has been employed as a stimulant.

In cancrum oris Rilliet and Barthez speak highly of the dry chlorinated lime, applied with the point of the finger to the ulcerated surface. The mouth should be well washed out a few seconds after each application. When cicatrization commences, a gargle, composed of 1 part of the powder, 30 of mucilage, and 15 of syrup, is recommended by the same authors. Its solution is also useful in scorbutic and other ulcerations of the mouth, and also in ptyalism.

A weak solution as a mouth wash is efficacious in foul breath, and in whitening the teeth. is also used as a bleaching agent for stained teeth. For this purpose the tooth should be prepared, thoroughly cleansed of all foreign matters, and then encircled with the rubber dam. The apical foramen should be plugged, and the chlorinated lime placed within the cavity of the crown of the tooth, and sealed up for a few days. The successful insertion of the chlorinated lime is attended with some little difficulty, and proper instruments, which must on no account be made of steel, but of hard wood, ivory or platinum, should be used.

The chlorinated lime is also used in conjunction with a solution of oxalic acid (10 grs. to 1 ounce of water) ; or acetic acid, either of full strength, or, which is better, a ten or twenty per cent. solution, that the liberation of the chlorine may be more gradual. The difficult point is to bury the acid in connection with the lime, so that, while it may accomplish the work effectually, there may be no loss of chlorine. This may be accomplished by dipping the instrument in the weak acid solution, then in the lime, and inserting the mass rapidly into the cavity. Another method is to use the lime made into a paste with distilled water, and when sufficient has been inserted to apply the acid by means of cotton wrapped around one of the platinum points. When the cavity is sufficiently full it should be immediately sealed with gutta percha. After remaining for several days, the dressing may be repeated if necessary, the canal being first thoroughly cleansed with water.

CAMPHORA.

CAMPHOR.

Formula.—$C_{10}H_{16}O$.

Botany.—A concrete volatile oil, obtained from the wood of *Camphora officinarum*, belonging to the Natural Order *Lauraceæ*—the Laurel order.

Imported in the crude form from China and Japan.

Preparation.—Obtained by decoction and sublimation; purified in this country by resublimation.

Characters.—White, translucent, tough and crystalline; has a powerfully penetrating odour, and a pungent taste followed by a sensation of cold. Volatilizes slowly at ordinary temperatures; floats on water, in which it is slightly soluble, readily soluble in rectified spirit of wine and in ether.

Physiological Effects and Therapeutics.—Externally it is an anodyne and local stimulant. Its local action on the mucous surfaces, the denuded derm, and ulcers, is that of an acrid.

In *moderate* doses, it first exhilarates and then acts as a sedative, giving rise to diaphoresis; it does this more effectually when combined with other diaphoretics. Opium contributes to the sudorific effects of camphor.

As a hypnotic, Dr. Wittich and Dr. Geo. Bird employ spirit of camphor with good results in the acute diarrhœa of infants.

It is a common ingredient in tooth powders, but it is stated (perhaps without sufficient reason) that its continued use in this way renders the teeth brittle.

A strong solution of camphor in chloroform applied on a pledget of cotton to the alveolar socket, is said to be an efficient remedy in allaying the pain induced by the extraction of teeth during severe periostitis.

Dose.—2 to 10 grains; of the spirit, 10 to 30 minims.

CAMPHORÆ MONOBROMIDUM.

MONOBROMIDE OF CAMPHOR.

Formula.—$C_{10}H_{14}OBr$.

Characters.—A colourless, crystalline substance, having a camphoric and terebinthic odour and taste; it is soluble in alcohol, oils, ether, bisulphuret of carbon, &c., but insoluble in water.

Preparation.—Prepared by the action of bromine on camphor, subjection of the product to heat, subsequent purification with animal charcoal and repeated crystallization.

Physiological Effects and Therapeutics.—Dr. Bourneville "considers the use of monobromide of camphor indicated when it is desired to produce an energetic sedative effect upon the circulating system, and especially the cerebro-spinal nervous system. It is one of the most clearly defined antispasmodics."

Dr. Hammond, in the *American Journal of Pharmacy*, reports that he had employed it in two cases of infantile convulsions, due to the irritation of teething, with the effect, in each instance, of preventing the further occurrence of paroxysms which, previous to the administration, had been very frequent. In each case gr. i. was given every hour, rubbed up with a little mucilage of acacia. Three doses were sufficient in one case, and two in the other. The children were aged respectively fifteen and eighteen months. He also administered it with great success in a very obstinate case of hysteria.

Dose.— For adults, 2 to 5 grains.

CANNABIS INDICA.

INDIAN HEMP.

Botany.—The dried flowering tops of the female plant of the *Cannabis sativa*, an annual belonging to the Natural Order *Urticaceæ* —the Hemp order. That grown in India, and from which the resin has not been extracted, is alone to be employed for medicinal use. It is largely used in India for smoking, under the name of *Gunjah*. The resinous exudation is removed from the leaves, stems, and flowers, and employed for its intoxicating effects under the name of *Churrus*. Dr. O'Shaughnessy first introduced Indian hemp into this country.

Chemistry.—The active principle is a resin, to which the name *Cannabin* has been given. It also contains some volatile and fixed oils.

Physiological Effects and Therapeutics.—Cannabis Indica has been given in tetanus, and might be tried in large doses for hydrophobia. Dr. Clendinning used it largely, and his opinion is as follows :—" It acts as a soporific or hypnotic in conciliating sleep ; as an anodyne in lulling irritation ; as an antispasmodic in checking cough and cramp ; as a nervine stimulant in removing languor and anxiety, and raising the pulse and spirits without any drawback or deduction on account of indirect or incidental inconveniences, producing tranquil sleep without causing constipation, nausea, or other effect, or sign of indigestion, without headache or stupor." Coffee and cocoa aid the action. In spasm, sciatica, tic douloureux, and other forms of neuralgia, Indian hemp ranks next in value to morphia and atropia. Dr. Reynolds says it relieves these derangements of the nervous system without interfering with any one of the functions of organic life, and does not produce the after suffering or misery which follows the use of opiates. Mr. Donovan quotes several cases in which it was of unequivocal benefit.

Antidote.—Hot brandy and water, lemon juice, vinegar, and the like. Blister to nape of the neck ; sleep.

Dose.—Of the tincture, 5 to 30 minims, rubbed up with mucilage.

CARBO ANIMALIS.

ANIMAL CHARCOAL.

Synonym.—Bone black.

The residue of bones which have been exposed to a red heat without the access of air, consisting principally of charcoal, phosphate and carbonate of lime.

CARBO ANIMALIS PURIFICATUS.

PURIFIED ANIMAL CHARCOAL.

Characters.—A black pulverulent substance, inodorous and almost tasteless. Tincture of litmus, with twenty times its bulk of water, agitated with it and thrown upon a filter, passes through colourless. When burned at a high temperature with a little red oxide of mercury and free access of air, it leaves only a slight residue.

Preparation.—Digest bone black in hydrochloric acid and water at a moderate heat for two days; thoroughly wash on a calico filter, until what passes through gives scarcely any precipitate with nitrate of silver; dry, and heat to redness in a covered crucible.

Action and Uses.—Animal charcoal is more active than the vegetable variety, for which this form may be substituted in any case. It is employed to remove colouring matter from solutions containing alkalies and alkaloids; but it is open to the serious objection that it tends also to combine with the alkaloid itself, and may remove it from the solution as well as the colouring matter. Thus animal charcoal has been shown to be a valuable remedy in many cases of poisoning, as, if given immediately, it absorbs and renders inoperative the most powerful alkaloids, and even hydrocyanic acid. About half an ounce is sufficient to neutralize each grain of morphia or strychnia.

CARBO LIGNI.

WOOD CHARCOAL.

Characters.—In black, brittle, porous masses, retaining the shape and structure of the wood from which it was obtained, odourless and tasteless. It possesses the remarkable power of condensing gases within its interstices; by virtue of this power it is an excellent disinfectant.

Preparation.—It is prepared by exposing wood to a red heat with a very limited supply of air, by which the hydrogen, &c., are burnt off, leaving the carbon.

Action and Uses.—Antiseptic and disinfectant. A valuable dressing to suppurating surfaces and gangrene. In a finely levigated state it is used as a tooth powder. The charcoal of the areca nut is supposed to be preferable, but it does not seem to differ from ordinary wood charcoal, except in being somewhat harder.

CATECHU PALLIDUM.

PALE CATECHU.

Botany.—An extract of the leaves and young shoots of *Uncaria Gambir*, belonging to the Natural Order *Cinchonaceæ*—the Cinchona order. Imported from Singapore and other places.

Characters.—In masses formed of coherent cubes; externally, brown; internally, ochre-yellow, or pale brick-red; breaking easily with a dull earthy fracture; taste, bitter, very astringent and mucilaginous, succeeded by a slight sweetness; entirely soluble in boiling-water.

Physiological Effects and Therapeutics.—Catechu produces the local and remote effects of astringent medicines generally. When of good quality, it is more powerful than kino. In its operation it is closely allied to rhatany.

In *ptyalism*, *ulceration* and *sponginess of the gums*, and also relaxation of the bowels, a piece of catechu allowed slowly to dissolve in the mouth is often of the greatest service. In *hypertrophy of the tonsils* it forms a very serviceable astringent gargle. A small piece of the catechu inserted into a carious tooth in which there is a fungoid growth, is often productive of relief.

Dose.—Of the tincture, 1 to 2 fluid drachms.

CERA FLAVA.

YELLOW WAX.

History.—The prepared honeycomb of the hive bee, *Apis mellifica*, belonging to the Class, *Insecta;* Order, *Hymenoptera*.

Characters.—Firm, breaking with a granular fracture, yellowish, having an agreeable honey-like odour. Not unctuous to the touch, does not melt under 140° F., yields nothing to cold rectified spirit, but is entirely soluble in oil of turpentine. Boiling water in which it has been agitated, when cooled, is not rendered blue by iodine.

Uses.—In softening yellow wax for impressions, the temperature should be gradually increased to and not exceed 140° F.

Either alone, or mixed with cotton, it answers the purpose of a temporary plug, to secure some more potent agent in the cavity of a tooth.

CHLORAL HYDRAS.

HYDRATE OF CHLORAL.

Formula.—Old: $C_4HCl_3O_2, 2HO$.
New: C_2HCl_3O,H_2O.

Characters.—Hydrate of chloral is colourless, and occurs either in rhomboidal plates or acicular crystals; it is soluble in less than its own weight of distilled water, rectified spirit, or ether, and in four times its weight of chloroform.

Preparation.—Chloral is produced by the action of dry chlorine gas on absolute alcohol, and purified by treatment, first with sulphuric acid, and afterwards with a small quantity of lime. It is converted into the solid crystalline hydrate by the addition of a small quantity of water.

Physiological Effects and Therapeutics.—As a hypnotic and anæsthetic, it was first brought into notice by Dr. Liebreich, of Berlin, and its claims have been carefully examined by Dr. B. W. Richardson. According to certain authorities, chloral produces anæsthesia by the chloroform it furnishes in decomposition through contact with the alkalies of the blood. In doses of 10 to 30 grains, dissolved in water, it speedily produces sleep, which generally continues for several hours. It produces, says Dr. Richardson, muscular relaxation, which extends to the muscles of volition, and alike to the iris and the arterial system. The action on the nervous system is primarily on the sympathetic ganglia, afterwards on the cerebrum, and finally on the heart. It reduces the blood pressure, partly by paralysing the vaso motor nerves, and also by its sedative action upon the heart.

Dr. T. B. Freke concludes that chloral possesses the following advantages over the hypnotics generally employed:—"It is more uniformly certain in its action. It has no depressing influence. It does not cause constipation. It does not produce nausea; and lastly, its effects are more permanent." According to Drs. H. Maund and Spencer Wells, it is not without its drawbacks; but, notwithstanding, it is regarded as one of the most valuable hypnotics in the Materia Medica.

It may be employed in cases of sleeplessness and excitement, where opium or other narcotics are objectionable; also in cases of acute pain, as neuralgic rheumatism.

As it lessens sensibility, and produces extreme muscular relaxation, it may be employed in various medical and surgical cases where it is necessary to overcome muscular resistance or spasm, as in dislocation of the jaw, &c.

Dr. Bouchut recommends the use of chloral as an anæsthetic for children, who appear to have great tolerance of it. He gives one dose, not exceeding 45 grains, to children under three years of age. In half an hour the patient is asleep, and in an hour insensible. The anæsthesia lasts from three to six hours, and is followed by no unpleasant consequences.

From half a grain to, at most, a grain of the granules of chloral, wrapped in a little wool to hold them together, and placed in the cavity of a tooth, has been found to relieve the most violent toothache in a few minutes. When equal parts of chloral and powdered camphor are rubbed together a syrupy liquid is formed, which when rubbed upon a painful part often affords relief, as in neuralgia.

It may also be administered subcutaneously.

Antidotes.—Strychnia, according to the experiments of Liebreich, acts as a speedy and complete antidote. When chloral hydrate has been administered in such quantity as to act rapidly on the respiratory centres, and the pupils are contracted, nitrite of amyl is indicated as the antidote; but when the drug has acted slowly as a culminative poison, the heart fails and the pupils are dilated, then strychnia should be given.

Dose.—5 to 30 grains.

CHLOROFORMUM.

CHLOROFORM.

(Formerly termed Chloride of Formyl).

Formula.—Old: C_2HCl_3. New: $\mathbf{CHCl_3}$.

Characters.—A limpid colourless liquid of an agreeable ethereal odour and sweet taste.

Soluble in alcohol and ether in all proportions, slightly so in water, communicating to it a sweetish taste. Sp. gr. 1·49.

It is exceedingly volatile, producing by its rapid evaporation great cold, with a slight tingling sensation.

Chloroform dissolves volatile oils, resins, camphor, and certain alkaloids.

It has the power of separating iodine, bromine, and certain alkaloids from their watery solutions.

It sinks in water forming globules, imparting no opalescence to it, which would indicate the non-presence of alcohol. The specific gravity would be a further indication of the non-admixture of alcohol.

Tests.—Soluble salts of baryta detect the presence of sulphuric acid ; a pink colour indicates the presence of manganese.

It does not redden litmus paper, nor give the slightest cloudiness to nitrate of silver. Should it do so, either hydrochloric acid, or the product of decomposition of some other chloride, is indicated.

It should remain perfectly colourless when boiled with potash ; the presence of aldehyde causes a brown coloration.

When shaken with concentrated sulphuric acid, and allowed to stand for half an hour, the two liquids should separate into two colourless layers. The presence of alcoholic chlorides produces a brown colouration.

The purity of chloroform may to a certain extent be judged by the complete insolubility of triethylros-aniline (Hoffmann's violet) in it, if it contains a trace of alcohol, the solution is coloured a beautiful purple.

Preparation.—By distillation of a mixture of rectified spirit, chlorinated lime and slacked lime, and subsequent purification and redistillation.

Physiological Effects and Therapeutics.—In small doses it is stimulant and antispasmodic. In large doses a narcotic, impairing sensorial power.

In the state of vapour, after the first two or three full inspirations, there is a feeling of warmth and excitation, extending from the chest to the extremities. This is succeeded by whizzing noises in the ears, a sensation of vibratory thrilling and benumbing throughout the body, followed by excitement of the brain with exhilaration, and phenomena similar to those produced by the protoxide of nitrogen; and, finally, loss of sensation, motion and consciousness.

After the slight and brief stimulation there follows general paralysis of respiratory muscles, due to its effects upon the nerve centres, the breathing becoming stertorous and shallow. The pulse becomes quick, perhaps, irregular, with marked loss of strength, due to direct sedative action on the heart. The arterial tension is lowered. The pupil at first is generally contracted, and then becomes dilated. When chloroform is administered in excess and too rapidly it appears to paralyse the respiratory centres, while the pulse remains unaffected and the pupils contracted; but when it is inhaled for a long time so that the agent accumulates in the system, the heart first yields to its influence, and succumbs before the respiration, while the pupils are dilated.

As chloroform vapour produces complete

anæsthesia and relaxes the muscular system, it is employed to avert the suffering attendant upon the reduction of dislocations, and other painful and protracted operations.

It has been advantageously employed in neuralgia, spasm of the glottis, and convulsions during dentition, croup, &c.

Among the unpleasant secondary results of its administration may be mentioned vomiting, headache, and severe collapse; but such cases may be regarded as exceptional. A mixture of ether and chloroform is largely recommended, and highly spoken of as safer than either agent alone.

Poisonous Effects are usually indicated by the breathing being stertorous, slow and laborious; the face pale, sometimes livid; the lips congested; the surface cold; the pulse sinks and soon becomes imperceptible at the wrist. There is complete and universal relaxation of the muscular system, including the sphincters, with entire loss of sensibility, and the pupils are generally dilated.

Death has occasionally been observed to take place with great rapidity, not more than one or two minutes having elapsed from the commencement of the inhalation. Death is most frequently due to syncope.

There are facts to prove that fatality is not so much dependent on the dose administered —for fifteen drops have proved fatal—as upon the mode in which the vapour is inhaled, and the condition of the patient at the time. It should *always* be administered with a due proportion of air.

The patient should be in a state of complete anæsthesia during the entire operation so as to avoid shock, which is not infrequently the cause of death, rather than the chloroform administered. Wherefore, chloroform in a small dose may be said to be dangerous.

The LOCAL application of chloroform to the gum prior to the extraction of a tooth very greatly lessens the pain of the operation. That its action may be purely local, cut a piece of pattern lead, or tinfoil, about an inch and a half square, line it with cotton or lint, which saturate with chloroform, adapt it closely to the tooth and adjacent gum, allow it to remain in close contact about two minutes, then immediately extract the tooth.

Antidotes.—When the pulse and respiration are failing, the patient should be placed in a horizontal posture, with the abdomen and lower extremities rather elevated, the tongue drawn forward, cold air fanned across the face, and cold water applied to the head. There should be a free passage of air to the mouth and nostrils; inflation of the lungs with air or oxygen gas by means of artificial respiration, or any of the methods adopted in cases of apnœa. Heat and friction may be applied to the chest and abdomen, and stimulants to the nostrils. If a galvanic battery be at hand, apply the positive pole of the battery to the back of the neck, and the negative pole to the end of the breast bone, breaking and renewing the current about fifteen times per minute. Hypodermic injection of 1 drachm of Ether. Nitrite of Amyl, see page 119. See also Nitrosum Oxidum.

Dose.— Spirit of chloroform, 10 to 60 minims.

CINCHONÆ FLAVÆ CORTEX.

YELLOW CINCHONA BARK.

Botany.—The bark of Cinchona calisaya, belonging to the Natural order *Cinchonaceæ* —the Cinchona order. Found in South America and the East Indies.

Characters.—In flat pieces, uncoated or deprived of the periderm, rarely in coated quills. In pieces from 6 to 18 inches long, 1 to 3 wide, and 2 to 4 lines thick, compact and heavy; outer surface brown, marked by broad, shallow, irregular, longitudinal depressions; inner surface tawny, yellow, fibrous; transverse fracture, short and finely fibrous. Somewhat aromatic, and persistently bitter.

Chemistry.—The principal organic constituents are volatile oil, quinia, quinidine, cinchonine; tannic, kinic, and kinovic acids.

Physiological Effects and Therapeutics.—All the varieties of cinchona are tonic, astringent, and anti-periodic, and are, of all medicines of their class, the most powerful and uniform in their action. They owe their astringency to the kinovic, cincho-tannic, and red cinchonic acids. Their tonic and anti-periodic properties are due to the alkaloids, quinia, cinchonine, and quinidine.

It sometimes happens that where the alkaloids fail to effect a cure, cinchona in substance is successful.

Dose.—Tonic 15 grains; Anti-periodic, 60 to 120 grains.

CITRULLUS COLOCYNTHIS.

COLOCYNTH.

Synonyms.—Bitter cucumber, Bitter apple.

Botany.—A member of the Natural Order *Cucurbitaceæ*—the Gourd order. A native of the South of Europe, Africa, Egypt, and India; and imported chiefly from Smyrna, Trieste, France and Spain. The Turkish is the best.

Chemistry.—Contains a bitter purgative principle named *colocynthin.*

Preparation.—The fruit is gathered in the autumn when ripe and yellow, and in most countries peeled and dried by exposure in the sun.

Medicinal Properties.—It is a powerful drastic hydragogue cathartic; dangerous in large doses. Used in obstinate constipation, but rarely given except in combination.

Dose.—Of the compound pill, 5 to 12 grains.

COBALTUM.

COBALT.

Formula.—**Co.**

This metal occurs sparingly in nature, found chiefly in combination with arsenic, as the arsenide or "*tin white cobalt*;" or with sulphur and arsenic, as grey cobalt ore or cobalt glance.

Uses.—Some prefer the monoxide of cobalt to arsenious acid for destroying the pulps of teeth, being of opinion that less irritation follows its action. It has also been used as an application to sensitive dentine, on the supposition that it is not absorbed so readily as arsenious acid when employed for the same purpose, but there is no proof of this.

COLCHICUM AUTUMNALE.

COLCHICUM.

Synonyms.—Common meadow saffron, Autumnal crocus, Tube root, Naked lady.

Botany.—An indigenous plant belonging to the Natural Order *Cucurbitaceæ*—the Gourd order. It is met with in the moist meadows of England and other parts of Europe. The corms and seeds are officinally employed, the former are about the size of a chestnut, white and fleshy internally, with an outer brown coat; if cut when fresh they yield an acrid and bitter milky juice.

Chemistry.—It contains an active principle; colchicia or colchicina, some resin and starch.

Preparation.—The corms should be collected in June or July, stripped of their coats, sliced transversely, and dried at a temperature not exceeding 150° F. The seeds should be gathered when fully ripe.

Physiological Effects and Therapeutics.—Colchicum causes increased action of some of the secreting organs, including the skin ; while the function of the heart is diminished. It affords relief in acute rheumatism, gout and other inflammatory affections. In neuralgia, colchium has not, in the opinion of Dr Copland, been so generally employed as it deserves. Its use should be preceded by cathartics, and given in conjunction with stimulants and tonics, *e.g.*, the carbonate of ammonia and cinchona. He relates a case in which, thus prescribed, it produced unequivocal benefit.

Dose.—Of the powdered corms, 2 to 8 grains ; extract, 1 to 3 grains ; wine, 10 to 30 minims ; tincture of the seeds, 10 to 30 minims.

COLLODION.

COLLODION.

Characters.—A colourless highly inflammable liquid with ethereal odour, which dries rapidly upon exposure to the air, and leaves a thin transparent film, insoluble in water or rectified spirit.

Preparation.—By adding one part of pyroxylin to a mixture of 12 ounces of rectified spirit with 36 of ether.

Uses.—Collodium is applied to many uses in medicine, surgery, and pharmacy. It has been used in cases of alveolar abscess threatening to point externally. It should be applied over the tumour by painting on successive layers with a camel's-hair pencil, so as to act as a compress, and either induce resolution of the abscess, or cause it to point into the mouth.

Applied on cotton, it is also used as a stopping, or to secure more potent agents in a carious tooth.

CREASOTUM.

CREASOTE.

Formula.—$C_8H_{10}O_2$.

Characters.—A colourless transparent liquid, of peculiarly strong odour and burning taste. Sp. gr. 1·071. Much of that found in commerce is carbolic acid ; it may be distinguished from it by its being insoluble in its own volume of glycerine.

Preparation.—During the destructive distillation of wood in the preparation of pyroligneous acid, creasote is formed, along with other hydrocarbons. It is also obtained from oil of tar, or pyroxylic oil, and is contained in the smoke from wood.

Carbolic acid has nearly taken the place of this agent; although very nearly identical in their action, some advantages are claimed for the Carbolic Acid.—(See *Acidum Carbolicum*, page 78.)

CRETA PRÆPARATA.

PREPARED CHALK.

Synonym.—Carbonate of lime.

Formula.—Old : $CaOCO_2$. New : $CaCO_3$.

Preparation.—Chalk freed from most of its impurities (soluble saline matter, flinty and gritty particles) by elutriation, and afterwards dried in small masses of a conical form.

Uses.—An ingredient in tooth powders, but preference should be given to the precipitated chalk of the pharmacopœia, as it is free from the grittiness of prepared chalk; also used in the finishing of stoppings.

CROTON CHLORAL HYDRATE.

See *Butyl Chloral Hydrate*, p. 136.

CUPRI SULPHAS.

SULPHATE COPPER.

Synonym—Blue Vitriol.

Formula.—Old: $CuO,SO_3 + 5HO$.
New: $\mathbf{CuSO_4\ 5H_2O}$.

Characters.—A blue crystalline salt in oblique rhombic prisms, soluble in water, yielding a pale blue solution which strongly reddens litmus.

Preparation.—Prepared by heating sulphuric acid and copper scales to dryness, re-dissolving the mass, filtering and crystallizing.

Physiological Effects and Therapeutics.—M. Féréol has given the ammoniacal solution of sulphate of copper in neuralgia (in six cases only). The neuralgia which, in nearly every case was of long standing, had resisted all other therapeutic means, and presented the characters of facial tic-doloureux. The disappearance of the pain was almost instantaneous, and although the painful phenomena might not have entirely vanished, still the improvement was very marked. The medicine should be continued for twelve or fifteen days at least, to prevent any relapse. Its topical action is stimulant, astringent, styptic, and caustic.

Applied to ulcers, either for the purpose of repressing excessively soft and spongy granulations, or hastening the process of cicatrization, it is one of the best agents we can employ. In superficial ulcerations of the mucous membrane, especially of the mouth, one or two applications are sufficient.

Dose.—¼ of a grain, gradually increased to 2 grains.

DATURA STRAMONIUM.

THORN APPLE.

Botany.—The dried leaves and seeds of Datura Stramonium, belonging to the Natural Order *Atropaceæ*—the Deadly Nightshade order. Found all over Europe and other parts of the globe.

Physiological Effects and Therapeutics.—Anodyne and anti-spasmodic. Its action is similar to belladonna. In neuralgia it has been employed with considerable success. Aggravation of dyspnœa, paralytic tremblings, epilepsy, headache, and apoplexy, are some of the evils said to have been induced in different cases. In those disposed to head affections, and in aged persons, it is, therefore, highly dangerous.

Like belladonna and hyoscyamus its active principle, as Dr. Garrod has shewn, is destroyed by caustic potash and caustic soda.

Dose.—Extract, ¼ of a grain. Tincture, 10 to 20 minims.

DIGITALIS PURPUREA.

PURPLE FOXGLOVE.

Synonyms. — Common foxglove, Finger flower.

Botany.—An indigenous biennial belonging to the Natural order *Scrophulariaceæ*—the Figwort order. A common plant in the Midland and Western Counties, but rare in the Eastern. It blossoms during the months of June and July, and the leaves should be collected when about two-thirds of the flowers have expanded, as they are then in their highest perfection. Those collected from the wild plants should alone be used.

Chemistry.—The active principle *Digitalin* occurs in the form of porous mamillated masses or small scales, which are white, inodorous, and intensely bitter. Digitalin is readily soluble in spirit, but almost insoluble in water and pure ether.

Physiological Effects and Therapeutics.—Digitalis is in certain conditions a sedative, and in other states of the system a stimulant, to the action of the heart. It is cumulative in action, and its use requries caution; if the effects be not observed in a few days, danger from accumulation may be feared, and it should therefore be discontinued. In sciatica and other neuralgic affections, Dr. Fuller speaks of digitalis—tincture 10 to 20 minims, three or four times a day—as a reliable remedy when the pain is intermittent, and of a purely neuralgic character. In earache, Dr. Lehman, after the exhibition of a mild purgative, advises, as an effectual remedy, the introduction into the meatus of a piece of cotton saturated with the tincture of digitalis.

Dose.—Of the tincture, 10 to 30 minims.

ETHER—see *Æther*, page 99.

ETHIDENE DICHLORIDUM.

DICHLORIDE OF ETHIDENE.

Formula.—$C_2H_4Cl_2$, or CH_3, $CHCl_2$.

Characters.—It resembles chloroform in appearance, taste, and smell, and is less inflammable than alcohol. Air passed through the liquid produces a vapour which burns at a jet like coal gas. It has not a uniform boiling point, but that is at about 115°F. The sp. gr. is 1·225. It mixes freely with alcohol, only slightly with water, and less so with chloroform.

Preparation.—Prepared from waste products in the manufacture of chloral.

Physiological Effects and Therapeutics.—Ethidene appears to occupy an intermediate position between chloroform and ether. It reduces the blood pressure to a considerable extent, but not so much as chloroform does; yet there is sometimes a depression of the pulse sufficient to cause alarm. It produces less excitement and is safer than chloroform, while a less quantity is effective than of ether.

Administration.—The method adopted by Mr. Clover is to get the patient nearly unconscious by means of nitrous oxide, and then to gradually add the vapour of ethidene. The pupils dilate at about the same time as stertorous breathing commences, and a little air is now given at every third or fourth inspiration, when the pupil again contracts. The quantity of ethidene is regulated according to the condition of the pupil and the unsteadiness of the patient, the pulse usually remaining much less affected than when the same narcosis is produced by chloroform. The pulse should be watched as well as the breathing. The anæsthesia usually continues some time after consciousness returns, and the patient awakes as from natural sleep, speaking clearly.

Another method, suggested by Mr. Bowman Macleod, consists in putting a sponge containing half an ounce of ethidene in the way-tube, or supply bag, of the nitrous oxide inhaler, leaving sufficient space on each side of the sponge for the free passage of the gas into and out of the bag. The sensation is said to be more profound and agreeable than when nitrous oxide alone is used; there is complete absence of sickness, while the lividity is present, if at all, only slightly on the lips. It also produces muscular relaxation rather than the rigidity induced by nitrous oxide.

As a LOCAL ANÆSTHETIC it may be applied to the seat of pain, as in neuralgia, &c.

ETHYL BROMIDE.

BROMIDE OF ETHYL.

Synonyms. — Hydrobromic ether; Bromic ether.

Formula.—C_2H_5,Br.

History.—Discovered in 1827 by Serullas, and attention was called to its anæsthetic properties by Dr. Nunnelly, of Leeds, in 1865; but the cost of its preparation seems to have precluded its adoption.

Characters.—It is a colourless, very volatile liquid, not inflammable, having an agreeable odour, and hot saccharine taste. Sp. gr., 1·420. Boils at 40° C. Sparingly soluble in water, freely in strong alcohol and ether.

Preparation.—Potassium bromide (not powdered), 58 parts; sulphuric acid (sp. gr. 1·838), 44 parts; alcohol (95 per cent.), 44 parts; water, 28 parts. Pour the water into a flask, and gradually add the acid; when cool, add the potassium bromide. Then place flask, with thermometer, in sand bath. Heat to 116° C., and allow the alcohol to flow from an elevation of three or more feet into the flask. Agitate the distillate with an equal bulk of distilled water, rendered slightly alkaline by solution of soda. When the mixture has separated into two layers, pour off the uppermost layer, and re-distil the heavier portion in a clean flask, with a few fragments of chloride of calcium.

Physiological Effects and Therapeutics.—Bromide of ethyl increases the pulse by its action on the heart, and slightly increases the blood pressure by stimulation of either spinal or peripheral vaso-motor system. It decreases respiration by central action, and kills by its toxic action upon the centres of respiration. In poisonous doses it depresses the action of the heart, but the inhibitory power of the pneumogastric is not paralysed. It produces more rapid anæsthesia than chloroform, and is eliminated more quickly; while the heart and respiration are less effected than with ether or chloroform. It does not cause the excessive secretion of mucus that ether does.

Administration—The mode of adminstration recommended by Dr. Gower is to fold a napkin, and pin it to a towel that will cover the patient's face. On the napkin 2 measured drachms should be poured; in two minutes from the time of administration another drachm should be given, and repeated every two minutes. The state of the respiration rather than that of the circulation is an index of the condition of ethylisation. In two or three minutes 2 drachms will produce anæsthesia as profound as that produced by an ounce of ether; yet a case is recorded where it required eleven minutes to bring a patient under its influence, and 9 drachms were used.

The advantages claimed for ethyl bromide as an anæsthetic are, its comparative safety; quickness in action; small quantity required; slight effects upon respiration and circulation; rapidity of return of consciousness; absence of after effects; pleasant odour; and non-inflammability. On the other hand, Dr. M. Sims says it does not answer well in long operations, nor where disease of the kidneys exists.

It has been recommended as a LOCAL ANÆSTHETIC. When used as a spray, the insensibility occurs before freezing.

The gum is made insensible by holding on the part a piece of lint moistened with it.

EUCALYPTUS—see *Oleum Eucalypti.*

FERRI ET QUINIÆ CITRAS.

CITRATE OF IRON AND QUININE.

Characters.—Greenish golden yellow scales, somewhat deliquescent, soluble in water, and having a strongly bitter taste.

Preparation.—Made by dissolving ferric hydrate in a solution of citric acid, and adding the recently precipitated quinia to it. A very dilute solution of ammonia is gradually dropped in, which changes the reddish brown colour of the liquid to a greenish tint; it is then filtered, evaporated and scaled.

Physiological Effects and Therapeutics.—Blood restorative, tonic, and anti-periodic.

It possesses the properties of both iron and quinine, and is admirably adapted for children and delicate females, being easily borne when the stronger salts of iron are inadmissible.

Dose.—5 to 10 grains.

FERRI ET STRYCHNIÆ CITRAS.

CITRATE OF IRON AND STRYCHNIA.

Preparation.—Dissolve 980 grains of citrate of iron in 9 ounces of water; also 10 grains of strychnia and 10 grains of citric acid in one ounce of water; mix the solutions, evaporate to syrupy consistence and scale.

Physiological Effects and Therapeutics.—Blood restorative, tonic, and nerve stimulant. It possesses the combined properties of iron and strychnia. A citrate of iron, quinine, and strychnia is also manufactured, containing the same proportion of strychnia.

Dose.—2 grains and upwards. Five grains contain $\frac{1}{20}$th of a grain of strychnia.

FERRI IODIDUM.

IODINE OF IRON.

Synonym.—Ferrous Iodide.

Formula.—Old: FeI. New: $\mathbf{FeI_2}$.

Characters.—Crystalline, green with a tinge of brown, inodorous, deliquescent, almost entirely soluble in water, forming a slightly green solution which gradually deposits a rust-coloured sediment (peroxide of iron); a coil of iron wire introduced into the solution partly remedies this deteriorating action.

Preparation.—Made by digesting iron wire and iodine in water at a gentle heat, evaporating until a drop of the solution, taken out on the end of an iron wire, solidifies on cooling. The liquid should now be poured out on a porcelain dish, and, as soon as it has solidified, broken into fragments and enclosed in stoppered bottles.

Physiological Effects and Therapeutics.—An alterative, tonic and emmenagogue. It is a very valuable salt, and particularly adapted for persons having scrofulous enlargements of the lymphatic glands; and also for other forms of scrofula attended with debility and emaciation. It often proves very useful in secondary syphilis, where the constitution is much debilitated and cachectic.

The syrup is the best form for administration.

Dose.—Of the syrup, ½ to 1 drachm.

FERRI PERCHLORIDUM.

PERCHLORIDE OF IRON.

Synonyms.—Ferric Chloride. Sesquichloride of Iron.

Formula.—Old: $Fe_2Cl_3 + 12HO$.
New: $Fe_2Cl_6 . 12H_2O$

Characters.—A yellowish crystalline mass with a strong styptic taste, and exceedingly deliquescent. Readily soluble in water and in rectified spirit.

Preparation.—Made by saturating hydrochloric acid with peroxide of iron by the aid of heat, allowing it to settle, pouring off the clear liquor, and concentrating, so that it may form a solid mass of crystals. This should be separated from the mother liquor, drained, and rapidly dried under a bell glass on a porous brick, and then transferred at once to a perfectly dry, well-stoppered bottle.

The *stronger* solution of Perchloride of Iron is, according to the British Pharmacopœia, prepared thus:—Iron wire, 2 oz.; hydrochloric acid, 12 oz.; nitric acid, 9 drs.; distilled water, 8 oz. Mix 8 oz. of the hydrochloric acid with the water, and pour the mixture on the iron wire, applying a gentle heat, so that the whole of the metal may be dissolved; filter the solution, and add to it the remainder of the hydrochloric acid and the nitric acid; heat the mixture briskly, until, on the sudden evolution of red fumes, the liquid becomes of an orange-brown colour; then evaporate by the heat of a water bath until it is reduced to 10 fluid oz., which should contain 20 per cent. of iron.

The following modification of the process has been suggested by Professor Maisch:—Mix the nitric and the reserved hydrochloric acids in an evaporating or suitable basin, heat them to 140°F, then filter into the mixed acids the solution of ferrous chloride previously heated to 150°F., and stir the solution while the liquids are mixing; oxidation takes place gradually and completely, the temperature rising to 160° F. or 165° F. There is no accumulation and sudden expulsion of nitrous fumes causing foaming, as in the officinal process. The result is an acid solution of ferric chloride answering to the requirements of the Pharmacopœia.

Physiological Effects and Therapeutics.—A powerful astringent and styptic, whether administered internally or applied externally. It has a reputed value as an anti-syphilitic and anti-scrofulus remedy. To fungous tumours, &c., it has been found a valuable application, not only for arresting hæmorrhage, but as a curative agent. Dr. M. Mackenzie has recorded a case of *syphilitic stenosis of the larynx*, in which inhalation of a "vapourised solution" of Perchloride of Iron (gr. v., aq. fl. oz. i.) was followed by most satisfactory results, all cough and stridor rapidly disappearing. In cases of *neuralgia* with *anæmia*, when no organic cause can be discovered the salts of iron are especially recommended. The long continued use of iron is highly beneficial in scrofula and rickets.

Dose.—Tincture and solution, 10 to 30 minims, freely diluted.

FERRI PERSULPHATIS LIQUOR.

SOLUTION OF PERSULPHATE OF IRON.

Formula.—$Fe_2O_3,3SO_3$ or Fe_23SO_4.

Synonyms.—Solution of Persesquisulphate of Iron; Sulphate of the Sesquioxide of Iron; Monsol's solution.

Characters.—A dense solution of dark-red colour, inodorous, and having a strong styptic taste; miscible with water and alcohol in all proportions. Sp. gr. 1·441.

Preparation.—Mix 1 ounce 30 grains (troy) of sulphuric acid with 1 ounce 300 grains (troy) of nitric acid, with half a pint of water, in a capacious porcelain capsule, and having heated the mixture to boiling point, add by degrees 12 ounces of sulphate of iron, stirring constantly during the several additions; when the effervescence has ceased, keep the solution in brisk ebullition until nitrous vapours cease to be given off, and the colour becomes a deep ruby tint; lastly, add sufficient distilled water to make it measure 12 fluid ounces.

Professor Maisch has suggested the following as a better mode of preparation:—Mix the nitric and sulphuric acids, heat them to 140°F., make a hot saturated aqueous solution of the ferrous sulphate (if necessary, a few drops of sulphuric acid may be added), and, when at a temperature of 180°F. or 190°F., filter it into the heated acids; oxidation takes place quietly and completely, the nitrous fumes being given off gradually from first to close of the operation. After oxidation is completed, the solution should be kept at 140°F. for a few minutes, to remove all traces of nitrous fumes. The result is a solution of ferric sulphate, with a slight trace of nitric acid.

Physiological Effects and Therapeutics.—Highly astringent without causticity. It is a very efficacious local styptic, and therefore well adapted to check hæmorrhage from parts not readily subjected to pressure, as the sockets from which teeth have been extracted.

FERRI PHOSPHAS.

PHOSPHATE OF IRON.

Synonym.—Ferrous phosphate.

Formula.—Old: $3FeO\ PO_5$. New: $\mathbf{Fe_3\,2PO_4}$

Characters.—A slate-blue amorphous powder, insoluble in water, but soluble in acids. It becomes of a green hue by keeping.

Preparation.—By decomposing a solution of sulphate of iron with mixed solutions of phosphate and acetate of sodium, collecting the resulting precipitate on a calico filter, and washing it with hot distilled water until what passes through no longer causes a precipitate on the addition of chloride of barium; and, lastly, drying it at a temperature not exceeding 120°F.

Physiological Effects and Therapeutics.—The phosphate, perphosphate, and superphosphate have often been indifferently called Phosphate of Iron. This alone is officinal. The Phosphates of Iron are sometimes administered with other phosphates in the form of syrups. They are blood restoratives, tonics, and alteratives, possessing the general properties of the ferruginous preparations, and are given with advantage in some forms of dyspepsia, and, in conjunction with lime, in the treatment of rickets.

Dose.—5 to 10 grains; of the syrup, 1 fluid drachm, or more.

FERRUM REDACTUM.

REDUCED IRON.

Characters.—A fine greyish-black powder, strongly attracted by the magnet, and exhibiting metallic streaks when rubbed with firm pressure in a mortar. It dissolves in hydrochloric acid, with the evolution of hydrogen, and the solution gives a light blue precipitate with ferrocyanide of potassium.

Preparation—Made by reducing the hydrated peroxide of iron to the metallic state, by heating it in a gun-barrel in a furnace, and passing through it hydrogen gas, previously rendered dry by having passed over sulphuric acid and chloride of calcium.

Physiological Effects and Therapeutics.—It is one of the most powerful remedies for restoring the condition of the blood in all anæmic states of the system. It is not astringent like other preparations of iron, and it usually sits easily on the stomach. There is no pulverulent state of iron so convenient as this for children, as it has no taste, and a very small dose is required.

Dose.—1 to 5 grains; for children, ¼ to 1 grain.

FERRI SULPHAS.

SULPHATE OF IRON.

Synonyms.—Ferrous sulphate, Green copperas.

Formula.—Old : $FeO,SO_3 + 7HO$.
New : $\mathbf{FeSO_4. + 7H_2O}$.

Characters.—Has a pale greenish-blue colour and a styptic taste, is insoluble in spirit, but soluble in water, and crystallizes in oblique rhombic prisms.

Preparation.—By dissolving iron wire in dilute sulphuric acid, and, when the action has nearly ceased, heating for about ten minutes to complete it, filtering and crystallizing. It may be obtained in a granular form by filtering the above solution into rectified spirit, instead of submitting to crystallization. In this form it is less liable to oxidation.

Physiological Effects and Therapeutics.—In harmony with the properties of iron salts in general it is a powerful astringent, but is apt to irritate the stomach.

Dose.—3 to 5 grains.

GALLA.

GALLS.

Botany.—Excrescences on the *Quercus Infectoria* or Dyer's Oak, belonging to the Natural Order *Cupuliferæ* or *Corylaceæ*—the Oak or Mastwort order. They are caused by the puncture and deposited ova of the *Cynips*, or *Diplolepis Gallæ tinctoriæ* or gall insect, a member of the order *Hymenoptera*. Imported from Asia Minor and Persia.

Characters.—Hard, heavy, globular bodies, varying in size, tuberculated on the surface, the tubercles and intervening spaces smooth, of a blueish-green colour, yellowish-white within, with a small central cavity; intensely astringent. The dark-coloured imperforated gall nuts are the best.

Physiological Effects and Therapeutics.—See *Acidum Gallicum and Acidum Tannicum.*

GELSEMINUM SEMPERVIRENS.

YELLOW JESSAMINE.

Synonyms.—Wild Jessamine, Woodbine, &c.

Botany.—A twining perennial belonging to the Natural Order *Scrophulariaceæ*—the Figwort order. Indigenous in the Southern States of North America.

Chemistry.—No accurate analysis of its chemical constitution appears to have been made, but its virtues are said to reside in a peculiar alkaloid principle termed gelsemina or gelseminin. Although all parts of the plant are active, the root is generally employed.

Physiological Effects and Therapeutics.—It is readily absorbed into the blood, and exercises a sedative action on the nervous system; like conium it is a paralyzer; but, unlike it in its mode of action, the paralysis does not commence at the periphery. Gelseminum destroys muscular irritability, and impairs the sensibility of the sensory nerves.

The symptoms from gelseminum come on quickly and soon subside; these are pain in the head and eyes, giddiness, affection of the sight, and numbness of upper extremities.

In large doses it is poisonous, causing great prostration, nausea, vomiting, dilatation of the pupils, and more or less loss of sight; inability to speak or move, coldness of the surface, and death by apnœa—paralysis of the muscles of respiration.

Gelseminum has very decided effect upon neuralgia of the fifth nerve; and in neuralgic and rheumatic affections generally it has been used with the most beneficial results, in doses of 10 to 20 minims of the tincture. In many cases the necessary dose to relieve pain produces the toxic symptoms mentioned above.

Dr. Miller has used it with success as an external application in neuralgia.

Dose.—10 to 20 of the tincture.

Antidotes.—Ammonia, brandy, quinine, and perhaps iodine.

GLYCERINUM.

GLYCERINE.

Formula.—Old: $C_6H_8O_6$. New: $\mathbf{C_3H_8O_3}$.

Characters.—A clear colourless fluid, oily to the touch, without odour, of a sweet taste, freely soluble in water and in alcohol. Should leave no residue when strongly heated in a capsule.

Preparation.—Produced in the saponification of fats and fixed oils.

Uses.—A valuable application to some diseases of the skin and mucous membranes, either alone or in conjunction with other substances. When used alone, it probably owes its efficacy to its physical properties, that of excluding air, and not drying at ordinary temperatures. It is a good solvent of many substances, such as borax, tannic acid, carbolic acid, gallic acid, arsenious oxide, &c., some of which are but slightly soluble in water.

GUAIACUM OFFICINALE.

GUAIACUM.

Botany.—A tree belonging to the Natural Order *Zygophyllaceæ*—the Guaiacum order. The wood *(Lignum Vitæ)*, which is imported from St. Domingo and Jamaica, is reduced by the turning lathe to coarse powder or small chips. The most important constituent of the guaiacum wood is a peculiar resin, *Guaiaci Resina.*

GUAIACI RESINA.

GUAIACUM RESIN.

Characters.—The resin is obtained from the stem of *Guaiacum officinale* by natural exudation, by incisions, or by heat. It occurs in tears and in masses. Guaiacum in tears is found in rounded or oval particles of variable size. Lump Guaiacum is the ordinary kind met with in commerce; it occurs in masses of considerable size, of a brownish or greenish brown colour, having a brilliant shiny resinous fracture and a balsamic odour. A solution in rectified spirit produces a clear blue colour when applied to the inner surface of a paring of a raw potato.

Physiological Effects and Therapeutics.—Both wood and resin are stimulant, diaphoretic, alterative, and tonic.

It appears to have great power in lessening excessive secretion from mucous surfaces, and in stimulating the action of the skin and kidneys. In its operation on the system it is allied to the balsams and turpentines. Its use is interdicted in cases of impaired digestion, inflammatory tendencies of the alimentary canal, and also in plethoric subjects.

In *chronic* rheumatism, guaiacum has maintained its character as a valuable remedy. In some forms of *neuralgia*, when partaking of a rheumatic character, the ammoniated tincture (m xx—xl every four hours) affords relief. In *cynanche tonsillaris*, Mr. J. Bell strongly recommends the internal use of guaiacum in half drachm doses every six hours—suspended in mucilage.

In the form of lozenge (trochis guaiaci) it arrests inflammation of the tonsils, and is useful both in acute and sub-acute inflammation of the pharynx, &c.

In syphilis, guaiacum was formerly regarded as a specific.

Dose.—Of the ammoniated tincture ½ to 1 drachm.

HAMAMELIS VIRGINICA.

WITCH HAZEL.

Synonyms.—Spotted Alder, Winter Bloom and Snapping Hazelnut.

Botany.—The Witch-Hazel is a shrub growing in damp woods and thickets in Canada and the United States, flowering in September and October.

It has a smooth, brown bark, the older bark being brown-grey and somewhat fissured, and, internally whitish and smooth. The leaves, oval or obovate, wavy, toothed on the margin, and, at least, when young, stellately pubescent.

The bark and leaves have been medicinally employed. The former has a bitter, astringent and somewhat pungent taste; the latter are astringent and bitter.

Chemistry.—The bark contains 8 to 10 per cent. of tannin and a bitter principle.

Uses.—Tonic, astringent and sedative. The bark is used as a remedy for hæmorrhage, particularly of a passive kind, and in congestions, swellings, sore mouth, &c. It may be employed in all cases in which astringents are indicated.

Dose.—Of the tincture, 2 to 5 minims.—As a lotion, 1 part tincture to 10 water.

HYDRARGYRI PERCHLORIDUM.

PERCHLORIDE OF MERCURY.

Synonyms.—Bichloride of mercury, Corrosive sublimate, Chloride of mercury, Mercuric chloride.

Formula.—Old: HgCl.
New: $HgCl_2$.

Characters.—It occurs in heavy colourless masses of prismatic crystals, having a highly acrid metallic taste. It is very slightly soluble in water, but more soluble in alcohol, and still more readily in ether. When heated, it sublimes without decomposing or leaving any residue.

Preparation.—By subjecting a mixture of sulphate of mercury and chloride of sodium to sublimation in a suitable apparatus.

Physiological Effects and Therapeutics.—A powerful irritant. In very small doses it is useful as an alterative in chronic affections, syphilitic or not, as in scaly skin diseases, periosteal affections, &c. EXTERNALLY it may be used as a lotion, injection, gargle, or ointment, in chronic skin diseases, ulcerated throat, and chronic discharges from mucous membranes. Its use is contra-indicated in persons predisposed to pulmonary disease, as it occasionally gives rise to great irritation of the lungs; and also, in inflammatory states of the urinary organs. (See also *Hydrargyrum.*)

Dose.—$\frac{1}{16}$ to $\frac{1}{8}$ grain; of the liquor hydra. perchlor., 30 to 120 minims.

HYDRARGYRUM.

MERCURY.

Synonym.—Quicksilver.

Formula.—Hg.

History.—Is found either pure in the form of globules, or combined with silver, but chiefly in combination with sulphur, as a sulphide. The principal mines containing it are those of Idria, in Carniola; Almaden, in Spain; and New Almaden, in California. It is usually imported in iron bottles holding from 60 to 100 lbs.

Characters. — Fluid at common temperatures, brilliantly lustrous, and easily divisible into spherical globules. Volatilises at a heat below that of visible redness, leaving no residue. Faraday has shown that at common temperatures, and even when the air is present, mercury is surrounded by a mercurial atmosphere. It boils at 662° F. Its sp. gr. is 13·5.

Preparation.—The extraction from the native Cinnabar (Sulphide of Mercury) is effected by mixing it with caustic lime, and distilling in an iron retort. The products are sulphide of calcium, sulphate of lime, and mercury which distils over.

Purification.—The purity is ascertained by its brilliancy and great mobility. Mechanical impurities—such as adhering dirt or dust—are instantly detected, and may be separated by straining through flannel or wash-leather. The presence of lead, tin, zinc, or bismuth, may be suspected by the rapidity with which the metal tarnishes in the air, and by its globules forming a *tailing* or train when made to roll on a flat surface, instead of preserving a spherical form.

Mercury is readily purified by re-distillation; or by adding to it a little strong solution of nitrate of mercury, agitating well and often for some time, then washing, drying, and straining through flannel; the inferior metals, tin, &c., are oxidized, whilst metallic mercury is reduced from the nitrate. Also by allowing it to run in a thin stream through a solution of ferric chloride contained in a long tube, the lower end of which passes some distance into a cylinder containing pure mercury. This cylinder is provided with a side tube through which the purified mercury runs off.

Uses.—Mercury is used in the production of amalgams, and is sometimes employed in the removal of amalgam stoppings. The mercury is applied by means of a suitable instrument with a silver point; the silver point having been scraped bright, is dipped into the mercury, and applied to the stopping; the affinity of the mercury for the silver causes a portion of it to adhere to the instrument, which on coming into contact with the amalgam stopping is overcome, unites with the filling, reduces it to a plastic condition, and thus allows of its easy removal. It is the practice of some to drill a cavity in the filling, and to place a globule of mercury in it, which soon softens the entire mass.

Physiological Effects and Therapeutics of Mercurial Compounds. — LOCAL EFFECTS.— These for the most part are alterative and more or less irritant. Many of the salts, as corrosive sublimate and the nitrate, are energetic caustics.

REMOTE EFFECTS.—In small and repeated doses, the first obvious effect of mercurials is an increased activity in the secreting and excreting organs. The absorbent or lymphatic system seems also to be stimulated to increased activity; at the same time, glandular swellings, enlargements, and indurations of various kinds are dispersed. When it is desired to obtain the sialogogue effects of mercury, somewhat larger or more frequent doses are given. Of all the secretions, none are so uniformly and remarkably augmented as those of the mucous follicles of the mouth and salivary glands; and the increased secretion is accompanied by more or less tenderness and inflammation of those parts, the whole constituting what is termed salivation or ptyalism. The first symptoms of that are slight tenderness and tumefaction of the gums, which acquire a pale rose colour, except at the edges surrounding the teeth, where they are a deep red. Gradually the mouth becomes very sore, and the tongue much swollen, coppery taste is perceived, the teeth are slightly loosened, and the breath acquires a remarkably fœtid odour; the salivary glands soon become tender and swollen, the saliva and mucus of the mouth flowing abundantly. In aggravated cases the teeth fall out, and periostitis and necrosis ensue.

In syphilis, the careful and sufficiently prolonged administration of mercury, carried to a degree short of ptyalism, is usually followed by the best results. In syphilitic ulcerations of the mouth and fauces the application of a mixture of blue pill (mercury 2, confection of roses 3, liquorice root 1) and glycerine is frequently very beneficial.

As alteratives, mercurials are given in small doses. Calomel is said to be less beneficial as an alterative than blue pill or grey powder. As a purgative it is given in larger doses.

Metallic mercury when taken alone into the stomach produces but little effect, owing, it is supposed, to the metal having to be oxidised before it can be absorbed; but it is given in a state of minute sub-division with chalk, as *Hydrargyrum cum Cretâ*.

To the effects of the administration of mercury during the sacccular development of the permanent teeth are—by some—ascribed the pitted and otherwise ill-formed "mercurial teeth."

Dose.—See the several preparations.

HYDRARGYRUM CUM CRETA.

MERCURY WITH CHALK.

Synonym.—Grey powder.

Characters.—A light grey powder free from grittiness; insoluble in water, but partially dissolved by hydrochloric acid, leaving the mercury in a state of minute division.

Preparation.—By rubbing one part, by weight, of mercury, with two of prepared chalk, in a porcelain mortar, until globules of mercury are no longer visible, and the mixture acquires a uniform grey colour.

Physiological Effects and Therapeutics.—Alterative and aperient. It is rendered slightly antacid by the presence of chalk; it is a mild unirritating preparation, and particularly adapted for children. In syphilis many prefer this preparation to the stronger forms of mercury. (See also *Hydrargyrum*).

Dose.—As an alterative 1 to 3 grains; aperient 5 to 15 grains.

HYDRARGYRI SUBCHLORIDUM.

SUBCHLORIDE OF MERCURY.

Synonyms.—Chloride of Mercury, Calomel, Mercurous Chloride.

Formula.—Old: Hg_2Cl.
New: Hg_2Cl_2.

Characters.—A dull, white, heavy and nearly tasteless powder, rendered yellow by trituration in a mortar. Insoluble in water, alcohol, and ether, and entirely volatilized without decomposition at a sufficient heat.

Preparation.—By moistening sulphate of mercury with a little water, and triturating with the proper proportion of mercury until globules are no longer visible; chloride of sodium is then added, and the whole thoroughly mixed. It is then submitted to sublimation and the sublimate thoroughly washed with boiling distilled water, then dried at a temperature not exceeding 212° F.

Physiological Effects and Therapeutics.—Alterative, stimulant, cholagogue, cathartic, anthelmintic, antiphlogistic, and antisyphilitic. In inflammatory affections, where it is important to induce mercurialism as speedily as possible, it is done more readily with calomel than with blue pill, provided that the cathartic action of the drug can be prevented. This is commonly effected without difficulty by combining it with opium. When given in doses of one or two grains every night as an alterative, in hepatic diseases or tertiary syphilis, for example, a brisk aperient should be given every second or third morning. Calomel may very usefully be combined with squills, digitalis, and antimony, as well as with opium, for it increases the special effects of these drugs, and at the same time appears to exercise a sedative influence.

In croup, mercury is a remedy of great value; and Dr. W. Squire observes, "Calomel should be given from the first, and repeated frequently in small doses (½ to 1 grain, with ⅛ to ¼ of ipecacuanha), interrupted occasionally for the administration of an emetic, &c." (See also *Hydrargyrum.*)

In cancrum oris, in the early stage, the black wash (calomel 3 grains, lime water 1 ounce) locally applied, is occasionally signally beneficial.

Dose—Alterative 1 to 2 grains. Cathartic 3 to 10 grains. Mercurialism 2 grains, with ¼ of opium, two or three times a day. In delicate persons less. Children usually bear a full dose.

HYOSCYAMUS NIGER.

HENBANE.

Botany—A poisonous indigenous plant belonging to the Natural Order *Atropaceæ*—the Deadly Nightshade order,—growing in waste places throughout Europe and Western Asia. The biennial plant is officinal; it is much larger than the annual, abounds with glandular hairs, and has a very powerful odour. The leaves only are officinal, and those of the wild plant should alone be used.

Chemistry.—It contains a volatile active principle termed *Hyoscyamine* or *Hyoscyamia*—an oily liquid which eventually concretes into warty crystals. It is soluble in water, alcohol, and ether; it has a heavy, tobacco-like odour, and a slightly acrid, bitter taste.

Physiological Effects and Therapeutics.—Narcotic, anodyne, and antispasmodic. In many, if not all respects, the effects of hyoscyamus correspond to those of belladonna and stramonium. Thus, it flushes the face, dries the mouth and throat, dilates the pupil. Hyoscyamus is generally used to produce sleep where opium disagrees. In neuralgia it is a powerful anodyne, but in affections of the nerves of common sensation it possesses no advantage over belladonna. Like atropia, *Hyoscyamia*, as Dr. Garrod proves, is destroyed by the fixed caustic alkalies. The fresh leaves are sometimes used as a cataplasm, or as a fomentation to allay pain in ulcers and tumours.

Dose.—Tincture 15 to 60 minims. Extract 3 to 6 grains. Succus ½ to 1 drachm.

IODOFORMUM.

IODOFORM.

Synonyms.—Teriodide of Formyl, Sesquiiodide of Carbon.

Formula.—Old : C_2HI_3. New : CHI_3.

History.—Discovered by Serullas in about 1824.

Properties.—A crystaline body of the colour of saffron, and of a sweet, pungent taste ; nearly insoluble in water, but soluble in alcohol, ether, chloroform, glycerine, and the essential oils. Its odour is unpleasant, but may be disguised by the essential oils and, when used in powder, by tannin.

Preparation.—It may be obtained by adding an alcoholic solution of potash to tincture of iodine, care being taken to avoid an excess ; then evaporating to dryness, and treating the residue with water ; the Iodoform remains undissolved. It may be regarded as chloroform ($CH.Cl_3$.) in which the chlorine is replaced by iodine (CHI_3).

Physiological Effects and Therapeutics.—In small doses it appears, according to Dr. Glover, to possess tonic, stimulant and alterative properties, exercising, at the same time, a remarkable influence on the nervous system, producing occasionally a kind of intoxication, followed by convulsions and tetanic spasms. Iodoform is said to relieve sciatica, neuralgia, and gout. A saturated solution in any of the essential oils has been recommended as an EXTERNAL application in neuralgia. 1 part of Iodoform *added to* 10 parts of collodion, makes an excellent application to enlarged glands in the region of the neck. In the form of ointment it is a healing and soothing application to spreading and sloughing sores, as bed sores and soft chancre. Iodoform must not be applied to inflamed tissues, or it will increase the inflammation, its action being somewhat that of a topical irritant.

As an *antiseptic*, Iodoform has been highly recommended. For this purpose it may be dissolved in any of the essential oils. Eucalyptus oil and Iodoform are antiseptic agents of a powerful and permanent kind, and they cause no irritation or destruction whatever of the tissues, as does strong carbolic acid. They may be used either alone, or together in any proportion. In the treatment of alveolar abscess eucalyptus oil may be injected into the sac, and the canal of the root of the tooth dressed with cotton dipped first in the oil and then in the Iodoform, or in a solution of the two. See *Oleum Eucalypti*, p. 237.

Several cases of poisoning have occurred from the absorbtion of Iodoform used as an antiseptic dressing to broken or suppurating surfaces.

Dose.—1 to 3 grs. with mucilage twice a day.

IODUM.

IODINE.

Formula.—I.

History.—A non-metallic (metalloid) element, discovered in 1812 by M. Curtois, and is obtained principally from the ashes of sea-weed. It exists largely in many marine plants.

Characters.—Iodine is very sparingly soluble in water, but freely so in alcohol, ether, and solution of iodide of potassium or chloride of sodium. It occurs in crystalline plates or scales, having a peculiar odour, dark colour, and metallic lustre. When heated, it sublimes, yielding a beautiful violet vapour, without leaving any residue. An aqueous solution strikes a deep blue colour with a cold solution of starch, even when very dilute.

Preparation.—The sea-weed is collected and dried, then submitted to distillation in an iron retort, part of the iodine is sublimed and condensed in the receiver, whilst iodides of sodium, magnesium and other salts remain in the retort, with charcoal in a minute state of division. The residue in the retort is then treated with water, and the less soluble salts crystallized out, leaving the more soluble in the mother liquor. This is evaporated to dryness, then mixed with bin-oxide of manganese and sulphuric acid, and subjected to heat, when the iodine sublimes, and may be purified by re-sublimation.

Physiological Effects and Therapeutics.—When given internally in small doses, it is an alterative-tonic, and imparts increased activity to most of the excreting and secreting organs. Iodine and its compounds, as remedial agents, are principally valuable for their resolvent influence in glandular enlargements, indurations, thickening of membranes (as the periosteum), and tumours; it appears to have a specific influence upon the Thyroid body. When administered internally, it should be in combination, as iodide of potassium, &c.

Applied EXTERNALLY, it produces intense local action, and often causes a prolonged sensation of pricking and smarting. When injected into abscesses, &c., it is supposed to produce a protective film upon the diseased surface, it stimulates reparative action, and, by its antiseptic properties, corrects the fœtor of the secretions. Dr. Davies states that in malignant and other ulcerations of the tongue, tonsils, &c., he has met with uniform success by the use of Iodine. The tincture may be applied locally by means of a fine brush, or made into a gargle, diluted with 7 or 10 parts of water with the addition of honey.

Chronic Alveolar Abscess, sinuses and cysts (ranula, &c.), are mostly curable by the injection of Liquor Iodi (B. P.), or of the tincture.

In *Mercurial Ptyalism*, a solution of 1 part of the tincture to 30 parts of water has been recommended.

In *Recession of the Gums*, a weak solution, as of 1 grain of Iodine to 1 ounce of water, is regarded as one of the best curative agents.

In Phagedenic Ulcerations, the tincture of Iodine has been extensively employed by Ricord. He found it very efficacious, and prefers it to all other preparations. Mr. Key regards it as one of the most powerful remedies we possess for arresting the threatened destruction of the soft parts.

In Syphilitic Gummata and Nodes, Mr. Acton states that the best local treatment consists in painting the affected parts every night and morning with the tincture.

In Acute and Chronic Periostitis.—A strong tincture, either alone or in conjunction with carbolic acid and tincture of aconite, painted upon the gum and around the neck of the affected tooth, or upon the surface of the part affected, is most beneficial.

In discoloration of the skin from a long use of the *nitrate of silver*, Dr. Patterson strongly advises the internal and external use of Iodine and its salts, as affording the best chance of restoring the natural colour.

Dose.—Of iodide of potassium, ½ to 10 grains.

IPECACUANHA.

IPECACUANHA.

Botany.—The dried root of Cephaëlis Ipecacuanha, a perennial, belonging to the Natural Order *Cinchonaceæ*—the Cinchona order,—and a native of Brazil. The roots are better when gathered from January to March; they are cut from the stems, cleaned, and dried in the sun. The root consists of two parts, the bark, in which the active principle resides, and the inner or woody part which possesses scarcely any virtue. The powder is of a pale brown colour, has a faint nauseous odour, and a somewhat acrid, bitter taste.

Chemistry.—It contains an active principle termed *emetina*, ipecacuanhic or cephaëlic acid, a trace of volatile oil, and some fatty matter.

Physiological Effects and Therapeutics.—Emetic, expectorant, diaphoretic, and alterative; it also possesses considerable sedative power, as shown by its influence in hæmorrhagic diseases. According to Mr. Higginbottom the main efficacy of Ipecacuanha consists in the power which he considers it to possess of stimulating and restoring the normal action of the capillary system. In large doses it is emetic, but in small ones it becomes absorbed and acts upon the different mucous surfaces, especially of the respiratory organs, and is therefore expectorant. In diarrhœa it often effects a cure when other medicines have proved ineffectual; this is the case with children when it arises from teething. Few remedies are so efficacious as Ipecacuanha in checking certain kinds of vomiting, as that resulting from general weakness; the vomiting of pregnancy, whooping cough, and that of drunkards.

Dose.—Emetic, 15 to 20 grains of powder. Antiemetic, 1 to 2 drops of the wine. Expectorant, ½ to 2 grains powder, of the wine 5 to 40 minims.

IRIDIS RHIZOME.

ORRIS RHIZOME.

Synonym.—Orris root.

Botany.—The so-called Orris root of commerce consists usually of the rhizomes of three species of Iris—*Iris florentina*, *I. pallida*, and *I. germanica*—, belonging to the Natural order *Iridaceæ*—the Iris or Corn-flag order. It is brought to us in the decorticated state, in casks, from Leghorn and Trieste.

Characters.—Occurs in pieces, simple or branched, more or less knotty, about the thickness of the thumb, of a whitish colour, bitterish acrid taste, and a violet odour. This odour is increased in the process of powdering.

Uses.—Used in tooth powders on account of its violet odour. During teething, infants are sometimes permitted to rub their gums with and bite it, but the practice is objectionable, as it contains an acrid substance which often causes derangement of the bowels.

ISONANDRA GUTTA.

GUTTA PERCHA.

Botany.—The concrete juice of Isonandra

Gutta (and probably other species). The Gutta Percha or Taban tree; a native of Sumatra, Borneo, and other Eastern islands, belonging to the Natural Order *Sapotaceæ* —the Sapota or Sapodilla order.

Characters.—In tough flexible pieces, of a light brown or chocolate colour; soluble, or nearly so, in chloroform, yielding a more or less turbid solution.

Preparation.—It may be obtained pure by dissolving the commercial Gutta Percha in methylated chloroform, and filtering the solution, to which is added methylated spirits of wine; the pure Gutta Percha being precipitated, is collected, dried and rolled into sticks.

Uses.—In conjunction with silica it forms a most useful stopping. A solution of it (in chloroform) may be employed to protect the surface of stoppings from the action of the fluids of the mouth until they are sufficiently hard not to be injuriously affected by them. In this form it is also useful to secure applications to sensitive surfaces or in cavities; the surface of the tooth should be carefully dried, the medicine placed in position, then covered with a strip of muslin dipped in the solution, and protected until the chloroform has entirely evaporated.

It is used for lining artificial dentures. Truman's Gutta Percha, being devoid of impurities, should be used for this purpose.

It is also used for taking sharp impressions of the mouth. For this purpose Mr. Walter Coffin recommends the following method of manipulation, thereby preventing the contortion of the material which otherwise takes place. "Provide a basin of cold water, and another, lined with a cloth, filled with boiling water. In the latter place some sheets of Gutta Percha, which immediately soften; it is then lifted out on a smooth stick or glass rod and dipped into cold water for a second. It may then be manipulated with wet fingers and placed in the impression cup; becoming thus somewhat chilled, the filled cup is put into the hot water again for half a minute, then just dipped into the cold, the superficial chill not harming the material. It should be retained in the mouth for about a minute and a half, quickly removed, and plunged into cold water, where it should be left until convenient to cast."

JABORANDI.

Botany.—Considered to be obtained from Pilocarpus pinnatifolius, a shrub belonging to the Natural Order *Rutaceæ*—the Rue order,—a native of Brazil. The leaves, which are generally used, abound in minute pellucid dot-like glands, have an aromatic odour and taste, soon producing a sensation of tingling in the mouth, accompanied by an increase of saliva.

Chemistry.—Its chief or active principle is an alkaloid termed *pilocarpine* or *pilocarpia;* it also contains a volatile oil, tannic acid, and an acrid resin.

Physiological Effects and Therapeutics.—This drug, long in use in South America, was lately brought from Pernambuco to Paris by Dr. Continho, who recommends it as a powerful diaphoretic and sialagogue. In large doses it causes nausea and, occasionally, emesis. Its action is very direct and uniform. An infusion of 30 to 60 grains causes, usually within ten or fifteen minutes, salivation and sweating, which generally become profuse, and continue about an hour. The pulse is simultaneously accelerated and relaxed, and the temperature slightly diminished. In some cases the salivation is excessive, and a pint or more of saliva may be collected within half an hour. When emesis occurs, it is often followed by considerable prostration. These symptoms have sometimes been reproduced twice a week for six weeks without injurious results; but the great hyperæmia of the salivary glands, which occurs during the action of the drug, appears to have resulted in inflammatory action and abscess in one or two cases. Jaborandi at first flushes and then pales the face. The pallor comes on when the sweating is active, showing that the sweating is not due to the excess of blood sent to the skin.

Jaborandi affects children far less easily than adults.

There is a marked antagonism between atropia and Pilocarpine; but in three respects they correspond, for both produce frontal headache and infrapubic pain, with desire to pass water, and both affect children less than adults.

Dose.—½ to 1 ounce of infusion (1 ounce of leaves to 10 ounces boiling water); pilocarpia ½ a grain.

KRAMERIA RADIX.

RHATANY ROOT.

Botany.—The dried root of Krameria Triandra, belonging to the Natural Order *Polygalaceæ*—the Rhatany order. Imported from Peru.

Physiological Effects and Therapeutics.—A powerful and valuable astringent; which property chiefly depends upon the presence of tannin, good specimens containing about 40 per cent. In passive hæmorrhages, Rhatany, either in the form of infusion or extract, has been found signally beneficial. It is doubtful whether it possesses any advantage over tannin.

In spongy and bleeding gums, the powder has been employed as a dentifrice; the tincture is also a good application. The infusion, or a solution of the tincture, forms a useful gargle in some varieties of relaxed sore throat and inflammation of the mouth.

LIQUOR SODÆ CHLORATÆ.

SOLUTION OF CHLORINATED SODA.

Synonym.—Labarraque's Disinfecting Solution.

Chemistry.—A mixed solution of hypochlorite of soda, chloride of sodium, and bi-carbonate of soda.

Characters.—A colourless alkaline liquid, with an astringent taste and feeble odour of chlorine.

Preparation.—By slowly passing washed chlorine into a solution of carbonate of soda. It should be preserved in a coloured stoppered bottle, in a cool dark place.

Physiological Effects and Therapeutics.—Externally, it is a stimulant, astringent, antiseptic, and deodorizer. It is best applied in the form of lotion (1 part to 10 or 15 parts of water). It forms an efficacious remedy in aphtha, stomatitis, and cancrum oris. In all affections of the mouth attended with a fœtid discharge—as mercurial salivation, the ulcerated gums of scurvy, and carious teeth—it proves highly serviceable, correcting the fœtor and, by its stimulating property, inducing a healthy reaction.

LITMUS.

LITMUS.

√ A blue pigment, prepared from various species of Rocella, belonging to the Natural Order *Lichenes*—the Lichen order.

The lichens are natives of the east coast of the Atlantic, and the west coast of South America. They are also met with on the extreme south coast of England, Guernsey, and the Scilly islands.

Blue litmus paper is made by steeping unsized paper in the tincture, and drying by exposure to the air.

Red litmus paper is prepared in a similar manner, having previously reddened the tincture by the addition of a very minute quantity of sulphuric acid.

Uses.—As a test paper for acids and alkalies. Blue litmus paper is turned red by acids, while red is turned blue by alkalies.

MAGNESIA.

MAGNESIA.

Synonym.—Protoxide of Magnesium.

Formula.—**MgO**.

Preparation.—Prepared by calcining carbonate of Magnesia in a Hessian crucible at a red heat, until there is no effervescence on the addition of dilute sulphuric acid.

Physiological Effects and Therapeutics.—An antacid and laxative. As an antacid it is preferable to the carbonate, as the latter, when brought in contact with the acid of the stomach, gives rise to much flatus.

It is serviceable in pyrosis and aphthous ulcerations, and is also a useful adjunct to tooth powders.

Dose.—10 to 60 grains.

MAGNESIÆ SULPHAS.

SULPHATE OF MAGNESIA.

Synonym.—Epsom Salts.

Formula.—Old : $MgOSO_3 + 7HO$.

New : **$MgSO_4\ 7H_2O$.**

Preparation.— Prepared by the action of dilute sulphuric acid upon Dolomite or magnesian limestone; subsequently filtering and evaporating the liquid to dryness, and then exposing the mass to a low red heat, to oxidise any iron that may be present; lastly, dissolving in water, filtering and crystallizing.

Physiological Effects and Therapeutics.—A refrigerant and saline purgative. In dyspepsia, accompanied by costiveness, the sulphate of magnesia, in small doses, has been found very effectual.

Dose.—Refrigerant, 10 to 60 grains. Purgative, ¼ to ½ ounce, or more.

MATICÆ FOLIA.

MATICO LEAVES.

Botany. — The dried leaves of *Artanthe Elongata*, belonging to the Natural Order *Piperaceæ*—the Pepper order. Imported from Peru.

Physiological Effects and Therapeutics.—Aromatic, bitter stimulant, slightly astringent. It may be given internally in powder, infusion, or tincture. As an internal remedy, its astringent properties are not well marked. Externally it is a reliable hæmostatic. The effect is probably due rather to the mechanical action of the leaf than to astringency. Hæmorrhage from leech-bites, from superficial wounds, and that following the extraction of teeth, &c., may be readily arrested by the local application of the *underside* of the leaf.

METHYL—ETHYLIC ETHER.

A solution of Methylic Ether $(CH_3)_2O$ in Ethylic Ether.

Preparation.—By heating 1 part of methylic alcohol with 2 parts of strong sulphuric acid, methylic ether is obtained. It is a gaseous compound of an ethereal odour, is purified by frequent washings in a strong solution of potash, and subsequently dissolved in Absolute Ethylic ether of sp. gr. 7·20 at a temperature of 32° F. This is then at once to be bottled and firmly corked down. It should be kept for some time before being used, the process of keeping producing a comparatively stable compound.

Physiological Effects and Therapeutics.—Recommended by Dr. B. W. Richardson, F.R.S., as an anæsthetic for dental operations superior to any hitherto employed. He describes it as "the readiest and best agent I know of for the purpose described. Better than nitrous oxide because it allows air to be given with it, and does not asphyxiate. Better than bichloride of methylene, because it does not produce muscular spasms and syncope."

In eleven out of several cases in which it was administered for the extraction of teeth, he states that the whole operation from commencement of the inhalation to the complete recovery was under three minutes; in some cases one minute was sufficient; while in two cases forty-five seconds sufficed. In no case was there spasm, syncope, or asphyxia during inhalation, or any after-nausea;

and in all cases there was a semi-consciousness, so that the patients did what they were bade to do, remembered what had been done, and yet were not conscious of pain.

MENTHOL.

Synonyms.—Japanese camphor; Peppermint camphor; Hydrate of menthyl, or Hydrous Menthene; Menthylic alcohol.

Formula.—**$C_{10}H_{20}O$.**

Characters.—Small white crystals, resembling sulphate of magnesia, deposited from Chinese oil of peppermint on exposure to cold. It was first imported from Japan some twenty years ago, and so much resembled Epsom salts that it was suspected to be that salt flavoured with peppermint. It probably has the chemical composition $C_{10}H_{20}O$, being the camphor or stearoptine of peppermint oil. It is slightly soluble in water, readily in alcohol, ether, and in oils both fixed and volatile; melts at the temperature of the body, and, when further heated, volatilizes without decomposition. Its sp. gr. is less than that of water.

Preparation.—It is derived from oil of peppermint either by long keeping, or by being cooled to a low temperature. The American oil yields it at the freezing point of water.

Physiological Effects and Therapeutics.—Menthol is anti-neuralgic, anti-spasmodic, and antiseptic. The Japanese "po-ho-yo" (or neuralgia remedy) probably contains

Menthol. The essential oils, says Professor Fraser, are productive of irritation of the mucous membranes; they are contra-tetanic, and diminish reflex excitability; they are antispasmodic, and cardiac stimulants, but, in large doses, paralyse the heart's action; they are also antiseptics and local anæsthetics, paralysing the terminations of sensory nerves—these properties are possessed to a greater or less extent by Menthol.

As a local application to carious teeth it is said to be more penetrating that any other substance.

As an antiseptic, it has not only the power to prevent putrefaction, but also the putrefactive process after that has begun. It kills bacteria. A solution of 1 to 100 possesses the power of a solution of carbolic acid twice the strength. Being so very volatile, it is well suited for penetrating into every nook and cranny where putrefactive action is going on. Its antiseptic properties are similar to those of its homologue, thymol (which see.)

Dose.—In neuralgia, or in toothache, ¼ to ½ a grain, well diluted.

MORPHIÆ ACETAS.

ACETATE OF MORPHIA.

Formula.—Old: $C_{34}H_{19}NO_6,C_4H_3O_3+HO$.
New: $C_{17}H_{19}NO_3,HC_2H_3O_2$.

Characters.—A white powder, imperfectly crystalline, slightly deliquescent; soluble in water and in spirit.

Preparation.—Prepared by precipitating the morphia from hydrochlorate of morphia by means of ammonia, collecting and washing the precipitate with distilled water, and then adding a sufficient quantity of acetic acid to dissolve and neutralise it; lastly, evaporating until it concretes on cooling, then drying by a gentle heat.

Physiological Effects and Therapeutics.—See Morphiæ Hydrochloras.

MORPHIÆ HYDROCHLORAS.

HYDROCHLORATE OF MORPHIA.

Formula.—Old: $C_{34}H_{19}NO_6HCl+6HO$.
New: $\mathbf{C_{17}H_{19}NO_3,HCl,3H_2O}$.

Characters. — In white, flexible, acicular prisms of a silky lustre, unaltered by exposure to the air. Soluble in spirit, in its own weight of boiling water, and in 16 parts of cold water.

Preparation.—It is prepared by thoroughly exhausting opium with distilled water, and evaporating the solution to small bulk. Solution of chloride of calcium is then added, and the whole concentrated until it becomes solid on cooling. This is submitted to strong pressure, which removes the mother liquor; the cake is then triturated with boiling distilled water, which removes the last trace, thrown on a filter, and washed with water. These washings and the mother liquor are now evaporated, cooled, solidified, and again pressed. The pressed cake is now dissolved in distilled water, treated with animal charcoal to remove the last trace of colouring matter; and then, after filtering, solution of ammonia is added in slight excess, which precipitates the morphia, leaving the codeia in solution. Morphia crystallizes out, is collected and dried. This is dissolved in hydrochloric acid, and the Hydrochlorate of Morphia allowed to crystallize. An additional quantity of Morphia may be obtained from the expressed liquid, &c.

Physiological Effects and Therapeutics.—As therapeutic agents, the salts of Morphia (acetate and hydrochlorate) are preferable to the alkaloid itself, on account of their greater solubility.

In tic-doloureux and other neuralgic affections, no remedy promises more speedy and permanent benefit than Morphia, subcutaneously injected. Affections of this kind, observes Dr. Anstie, which under any of the older plans of treatment would at least have been very tedious, are sometimes cured after three or four injections of one-sixth of a grain, and very many yield after a week or ten days' employment of such injections repeated twice daily. It may almost be regarded as a specific.

The endermic application of morphia (½ to 1 grain) sprinkled on a blistered surface over the seat of pain, is sometimes effectual, but is less certain in its operation than when injected hypodermically.

Morphia, in combination with carbolic acid, is an excellent application to obtund the pain of an exposed or sensitive pulp.

Dose.—Of the acetate or hydrochlorate 1/8 to 1/2 a grain.

Antidotes.—Tannic acid, animal charcoal, emetics, enforced exertion, atropia. Of the latter Dr. Johnston uses 1/6 of a grain, or even 1/2 a grain, indeed, until belladonna-intoxication, is produced. On the authority of Bartholow, 1 grain of morphia requires 1/20 of a grain of atropia to counteract its effects.

MYRRHA.

MYRRH.

Botany.—A gum-resinous exudation from the stem of *Balsamodendron Myrrha*, belonging to the Natural Order *Amyridaciaæ*—the Myrrh order. Collected in various parts of Africa and Asia.

Physiological Effects and Therapeutics.—Myrrh is a mild astringent and moderate stimulant. It possesses the power of diminishing excessive secretions from the mucous membranes; the tincture undiluted is serviceable when applied to foul and indolent ulcers of the mouth. Diluted, it is useful as a stimulating mouth wash in sponginess and ulceration of the gums, and also in other affections of the mouth and throat.

It is used as a dentifrice, sometimes alone, but mostly with other substances.

NITROSUM OXIDUM.

NITROUS OXIDE.

Synonyms.—Protoxide of Nitrogen, Laughing Gas.

Formula.—Old : NO. New : $\mathbf{N_2O}$.

History.—Discovered by Dr. Priestly in 1776, who termed it *Dephlogisticated nitrous air ;* but it does not appear that this gas was experimented upon to any practical purpose until Sir Humphrey Davy's investigations proved it to be respirable. The result of his experiments were published in the year 1801, under the title of "Researches Concerning Nitrous Oxide," and here we find the expression of his faith in its applicability towards the production of transient insensibility. From this time to the year 1844, it would seem that no effort was made to utilize the agent; but on the 10th of December, of the last-mentioned year, Mr. Horace Wells, a Dentist in Hartford, Connecticut, attended at Hartford a Scientific Lecture by Mr. G. Q. Colton. The gas was inhaled by a Mr. Cooley ; he became excited, and performed sundry evolutions, during which he contused and abraded both his shins pretty extensively. The man on recovering was questioned by Mr. Horace Wells, who ascertained that he was altogether unconscious of having sustained any injury. Reflection led Mr. Wells to the belief that a man could, by inhaling the gas, render himself so insensible that he could have a tooth extracted without pain ; this he resolved to test in his own person. The next morning Colton administered the gas to him, and Dr. Riggs, a Dentist, extracted a carious tooth, and without the slightest pain. Shortly afterwards, Wells went to Boston, U.S., and his endeavours were for a time concentrated upon the effort to bring it into use, but he failed to impress the profession at Boston with the importance of the discovery. In March, 1847, Wells wrote a pamphlet thereon, and the same year he visited Europe. He died in New York, on the 24th January, 1848, aged 33.

At a meeting of the Medico-Chirurgical Society of Edinburgh, held November 10th, 1847, Sir J. Y. Simpson read a paper in which he alluded to the use of Nitrous Oxide in surgical operations, and made mention of its use by several American practitioners.

After Wells' decease, Colton tried for years to induce Dentists to adopt it, but without success ; yet in 1863, Smith, of New Haven, Connecticut, operated while Colton gave the gas. From that time its use in America became general.

In 1864, Mr. S. Lee Rymer tried to introduce it into England.

Dr. Colton visited Paris in 1867, and induced Dr. Evans to adopt it. The same year Dr. Evans came to England, with a view to its introduction here. The following year Dr. Colton visited England, and, at the house of Mr. C. J. Fox, administered the gas to several persons in the presence of a number of professional gentlemen.

It was prepared in a condensed form by Mr. Barth, and subsequently in the liquid form by Mr. Coxeter, at the suggestion of Mr. C. J. Fox.

Characters.—A colourless, transparent, and almost inodorous gas, having a sweet taste. Sp. gr. 1·525. It liquifies at a pressure of 50 atmospheres at 45°F.

Preparation.—By subjecting pure Nitrate of Ammonia to a temperature of about 400°F. in a retort or flask (taking care that the temperature does not exceed 480°F.) Nitrous Oxide Gas is evolved; wash, and collect it over tepid water, as cold water dissolves nearly its own weight of this gas. If a higher temperature than 480°F. be applied, Nitric Oxide will be given off. This may be separated by passing the gas through a solution of Sulphate of Iron (green vitriol). Sometimes the Nitrate of Ammonia contains Chloride of Ammonium; if so, the Nitrous Oxide Gas will be impregnated with Chlorine. To ensure the absence of this, the gas should be passed through a solution of caustic potash, and finally through tepid water.

For ascertaining the purity of nitrate of ammonia, the following simple tests may be employed. 1st. Take two grains of the salt and dissolve it in half a drachm of distilled water in a test tube; to this solution add, drop by drop, a small quantity of one containing 4 grs. of nitrate of silver in a drachm of distilled water. A light cloud and curdy deposit will indicate the presence of chlorides.

2nd. To a similar solution of the nitrate of ammonia as above described, add a small quantity of one composed of 6 grs. of chloride of barium in a drachm of distilled water. A white cloud will indicate the presence of carbonates or sulphates. These test solutions may be preserved for future use.

Physiological Effects and Therapeutics.—The pure gas, when inhaled in the ordinary way, produces exhilaration and narcotism, and this without asphyxia; but when atmospheric air is carefully excluded, it produces anæsthesia without exhilaration. The effect, however, only lasts a short time. The time required to produce anæsthesia is from 25 to 120 seconds, by from 10 to 60 inhalations, and a consumption of from 2 to 8 gallons of gas. Dr. Barnes kept a patient 10 minutes under its influence, and no unpleasant symptoms accompanied or followed its use. He has stated he would not hesitate to employ it longer if necessary. Two cases are mentioned by him where the operation lasted over an hour and a-half.—*Medical Times*, 1875. By Mr. R. Rendle it is said to be safe in all short operations, and perhaps in long ones also, provided there is due admission of air at proper intervals.

It is evident that Nitrous Oxide has a strong affinity for the blood corpuscles, that it may usurp the place of oxygen in them, and prevent for a time that combination of oxygen with hæmaglobin upon which the red colour of the corpuscles depends; yet chemistry has not shown that Nitrous Oxide is decomposed in the blood, or that it exerts any of the chemical properties of oxygen on the constituent elements of the blood. M. Paul Bert states that, at the time of anæsthesia, one hundred volumes of arterial blood contain forty-five volumes of Nitrous Oxide.

The moment the slightest anæsthetic effect is produced upon the nervous system, the medulla oblongata, the spinal cord, the nerves of organic life, the cerebrum, and the cerebellum are affected simultaneously. To oxidation is undoubtedly due the whole available force in the body. This oxidation is mainly, if not entirely, effected by the blood, and it is, therefore, evident that a continuous flow of oxygenated blood to the nerve centres is necessary as a source of power, as well as for regeneration of the nerve tissue. Any deficiency of oxygen in the blood is followed by a decreased arterialisation of the whole volume of the blood. In this case the exhalation of carbonic acid is relatively less rapid than its production, and life is impossible when the blood in the arteries has become thoroughly venous in colour and character. When Nitrous Oxide has been absorbed by the blood, the most obvious result is a change in the colour of the corpuscles, and, consequently, lividity of the face and mucous surfaces. The latter is characteristic in those subjected to its influence, and the darkened colour of the blood is observed when it flows from the severed vessels. This colour of the blood is, probably, to be partly ascribed to uneliminated carbonic acid; but that Nitrous Oxide has in a high degree the property of darkening the blood corpuscles may be proved by directing, for a few seconds, a jet of the gas upon a little arterial blood in a test tube. Yet, from what has already been said, this change is due to physical rather than to strictly chemical action.

An interruption of the circulation in any part of the system is soon followed by impaired sensibility of that part; and it is also true that during the anæsthetic state the circulation of the blood through the capillary system becomes sluggish. A tendency to stasis begins to appear, while at the same time the supply of arterial blood is considerably reduced. These are facts of direct experimentation, and they have been employed to furnish the proof that the brain itself is, during the period of anæsthetic insensibility, in a state of comparative anæmia. However, it is most probable that an arrest of the capillary circulation through the brain, to which several writers have attributed a potential influence in the causation of anæsthesia, is simply, so far as it may exist, a *result* of the anæsthetic state.

From the foregoing, and from what has been written upon the subject, the following deductions and propositions may be here established:—

Nitrous Oxide when passed through arterial blood in a test tube darkens its colour, but does not alter the form of the red corpuscles.

When Nitrous Oxide is inhaled the patient assumes a dusky hue, and the blood which flows from a ruptured vessel is dark in colour.

The gas eliminated from the lungs is apparently in the same condition as when it entered.

Is the lividity due to the blood not being oxygenated—to carbonic acid taking the place of oxygen,—or to an altered condition of the blood, the result of the immediate presence and (physical) action of Nitrous Oxide?

Though at first there is some exhilaration, anæsthesia would appear to be due to an altered condition of blood, whereby the molecular dynamic changes are interfered with. And such interruption is probaby due either to the retention of carbonic acid, or to the presence of Nitrous Oxide; or, as in both instances, to the exclusion and absence of oxygen.

It causes considerable general venous and capillary congestion, especially of the pulmonary system. Hence its exhibition is contra-indicated in advanced visceral diseases, and where there is known to exist fatty degeneration or atheroma of the blood vessels. In the latter cases, for instance, the increased tension may cause rupture of a cerebral vessel and apoplexy.

The advantages of the Protoxide of Nitrogen over other anæsthetics for minor operations are:—

1. Its safety.

2. The shorter time in which anæsthesia can be induced, viz., 25 to 120 seconds.

3. The readiness with which the patient can

be kept for either a long or a short period under its influence.

4. Its effects pass off quickly.

5. No danger of ignition.

6. Being pleasant to inhale, and not irritating (if pure) to the air-passages, fright and mental distress are avoided, thus diminishing the danger of death by syncope.

7. Because sickness and other unpleasant after effects are very rare.

Administration.—Conditions to be observed in its administration :—

1. When the services of an experienced administrator cannot be had, an intelligent assistant should be present—the administration and operation should never be performed single-handed. The apparatus or face piece recommended is that introduced by Mr. Clover. The patient is placed in a good light, and on a chair constructed for supporting the head so that it cannot easily slip; the dress, if tight, having previously been loosened.

2. The patient should not have taken food for at least two hours before the administration ; at the same time it is desirable to guard against exhaustion.

3. The gas should be *perfectly* pure, free from all trace of chlorine and nitric oxide, and tolerably fresh.

4. The tube through which the inhalation takes place should be of larger diameter than the trachea, and a liberal supply of gas should be kept up. It is an advantage to have the pressure of gas in the bag slightly in excess

of the atmospheric pressure; this will diminish the risk of the admission of air in consequence of any imperfection in the adjustment of the face-piece.

5. A gag having been placed in the mouth, the face-piece should be most accurately adjusted, and where the face is much covered with hair the latter should be well soaped, for it is essential that air be most carefully excluded until the patient be fully under the influence of the gas.

6. The patient should be instructed to breathe deeply, regularly, and fearlessly, and to breathe out thoroughly.

7. The administrator of this anæsthetic should have special regard to the respiration, the pulse, the eye, and the countenance.

8. The evidence of the full effect of the gas is shown usually by the blue colour of the lips, by the breathing becoming stertorous, and the insensitiveness of the conjunctiva.

9. Its inhalation should not be continued for a longer period than one and a-half or two minutes without the admission of air to the lungs.

In addition to the above suggestions it is advisable to maintain perfect quietude, both during the inhalation and recovery. The operator and administrator should be as much out of sight as convenient, and thus avoid any disturbance of the patient's mind during the period of semi-consciousness. The gag should be very carefully made and adjusted; also attached to another gag or weight (out of the mouth) by means of strong silk cord. When several teeth are to be removed at a single inhalation, the operator should commence with those farthest back in the mouth and with the lower before the upper teeth; by so doing the view of the teeth to be removed is less obstructed by the bleeding caused by those already extracted. When the condemned teeth are extracted, the head should be held forward so as to allow the blood to escape through the mouth, but the gag is not usually removed until consciousness is restored. If these conditions are observed, little fear need be apprehended.

As any interference or suspension of either the nervous, circulatory, or respiratory systems cannot be resorted to without some risk to life, it may be well to briefly consider the conditions under such circumstances.

Death arises either by coma, syncope, or apnœa.

Coma—or deep sleep.—The arrest of the functions of the brain, caused either directly or indirectly by the injurious effects upon it of some noxious agent.

Syncope—fainting or swoon.—A sudden suspension of the heart's action, accompanied by cessation of the functions of the organs of respiration, internal and external sensation and voluntary motion, caused either by some derangement of the circulatory system, the nervous system, or other organs of the body.

Apnœa—Incorrectly termed asphyxia; the term apnœa meaning breathlessness, asphyxia pulselessness. It is the first-named condition that we have now to deal with. It may be caused

1. By an arrest of the action of the muscles of respiration, due to exhaustion of the muscles, to lóss of motor nervous influence, to mechanical restraint, or tonic spasm.

2. By a cessation of the action of the lungs, due either to injury or compression of the pneumogastric division of the eighth pair of nerves; or to mechanical obstructions, as admission of air, abdominal viscera, &c., into the chest by wounds.

3. By exclusion, partially or entirely, of atmospheric air from the lungs. This may arise from extreme rarefication of air; mechanical exclusion, as by a foreign body in the larynx, trachea, or upper part of the œsophagus; by submersion, by suffocation, strangulation, or suspension; or the atmospheric air may be replaced by a gas which acts merely by excluding it; or, lastly, by irritant gases producing spasm of the glottis.

When the process of respiration is stopped, either by arresting the respiratory movements, or permitting them to continue in an atmosphere deprived of uncombined oxygen, the circulation of blood through the lungs is re-retarded, and at length stopped; there is circulation of venous blood to the brain and body, and consequent impairment of their functions. The effect of the impaired pulmonary circulation is an obstruction to the exit of blood from the right ventricle; this is followed by delay in the return of venous blood to the heart, and to this succeeds venous congestion of the medulla oblongata and the nerve centres. Hence slowness and disorder of the respiratory movements, and consequently of the cardiac movements. Under these combined conditions the heart at length ceases to act; as already implied, the cessation of its action being in a great measure brought about by the imperfect supply of oxygenated blood to its muscular and nerve tissue.

To the accumulation of carbonic acid in quantities too large to be eliminated by the secreting apparatus of the lungs, and the consequent turgescence of the capillary vessels, must in the first place be ascribed the phenomena of apnœa. Stoppage of the circulation through the lung has been ascertained to take place first in the capillaries, then in the arterioles, and, lastly, in the larger vessels. And it is worthy of observation that the sequence of recovery is exactly the reverse.

When apnœa results from the administration of anæsthetic agents, such efforts should be made for resuscitation as the following:—The main reliance is on artificial respiration; this should be resorted to without a moment being lost. The action of the heart usually continues for three or four minutes after respiration has ceased; these are the precious minutes. The three principal methods whereby to affect artificial respiration are the Marshall Hall; the Silvester; and the Howard.

The MARSHALL HALL method:—Having, either with forceps or a tenaculum, drawn the patient's tongue forcibly forwards, so as to cause retraction of the arytenoid cartilages, lie the patient on the face, with the right arm doubled under the forehead so as to prevent obstruction to the mouth, then turn the body gently, and completely, on the side and a little beyond; alternately repeating these movements deliberately, efficiently, and perseveringly, fifteen or twenty times in a minute. When the patient reposes on the thorax, this cavity is compressed by the weight of the body, and expiration takes place; when he is turned on the side, this pressure is removed, and inspiration occurs. When the prone position is resumed, make equable but efficient pressure along the spine, removing it immediately before rotation on the side (the first measure augments the expiration, the second commences inspiration).

Dr. H. R. SILVESTER'S method of restoring natural breathing is the one adopted by the Royal Humane Society, and is practised according to the following rules:—

RULE I.—*To adjust the Patient's Position.*—Place the patient on his back on a flat surface; raise and support the head and shoulders on a small firm cushion or folded article of dress placed under the shoulder blades. Remove all tight clothing about the neck and chest.

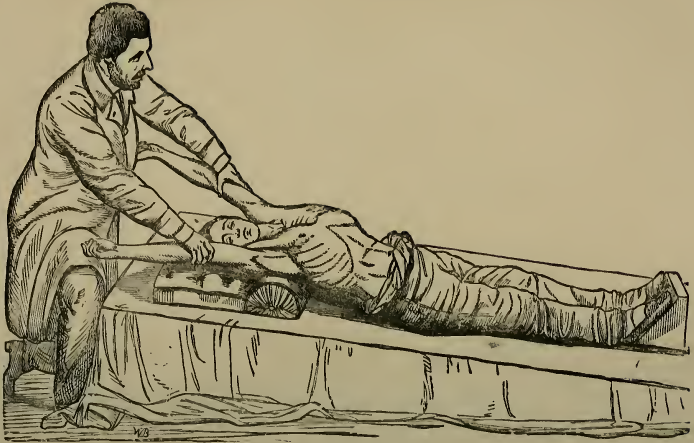

FIG. 1.—INSPIRATION.

The Position of the Body during the Employment of Dr. H. R. SILVESTER'S Method of Inducing Inspiration.

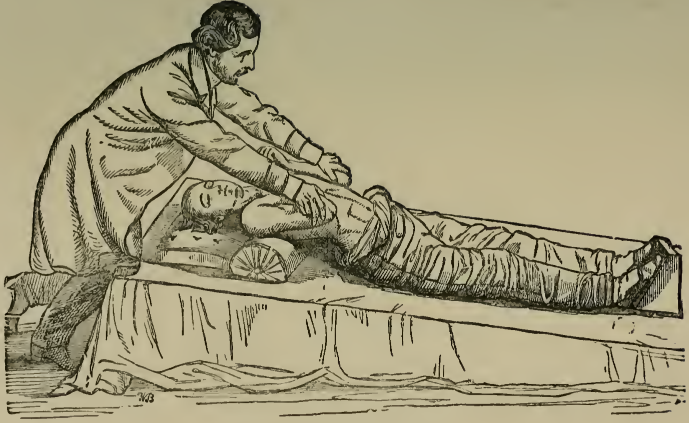

FIG. 2.—EXPIRATION.

The Position of the Body during the Employment of Dr. H. R. SILVESTER'S Method of Inducing Expiration.

RULE 2.—*To maintain a Free Entrance of Air into the Windpipe.*—Cleanse the mouth and nostrils; open the mouth; draw forward the patient's tongue, and keep it forward: an elastic band over the tongue and under the chin will answer this purpose.

RULE 3.—*To Imitate the Movements of Breathing.*

First.—INDUCE INSPIRATION.—Place yourself at the head of the patient, grasp his arms, raise them upwards by the sides of his head, stretch them steadily but gently upwards and backwards for two seconds. By this means fresh air is drawn into the lungs by raising the ribs. (See Fig. 1.)

Secondly.—INDUCE EXPIRATION.—Immediately turn down the patient's arms, and press them firmly but gently downwards against the sides of his chest for two seconds. By this means foul air is expelled from the lungs by depressing the ribs. (See Fig. 2.)

Thirdly.—CONTINUE THESE MOVEMENTS.—Repeat these measures alternately, deliberately, and perseveringly fifteen times in a minute, until a spontaneous effort to respire be perceived. By these means an exchange of air is produced in the lungs similar to that effected by natural respiration.

In the third, or HOWARD'S method of artificial respiration:—

* 1st. Instantly turn the patient downwards,

with a large firm roll of clothing under the stomach and chest.

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* This and the next paragraph specially refer to cases of drowning. They have been inserted here in order to give all the principles of the method.

* Press with all your weight two or three times, four or five seconds each time, upon the patient's back, so that the water is pressed out of the lungs and stomach, and drains freely downward out of the mouth. Then—

2nd. Quickly turn the patient face upwards, the roll of clothing put under his back just below the shoulder blades, the head hanging back as low as possible.

Place the patient's hands together above his head; kneel with patient's hips between your knees; fix your elbows against your hips. Now, grasping the lower part of the patient's chest, squeeze the two sides together, pressing gradually forward with all your weight, for about three seconds, until your mouth is nearly over the mouth of the patient; then, with a push, suddenly jerk yourself back. Rest about three seconds, then begin again. Repeat these bellows-blowing movements, so that air may be drawn into the lungs, about eight or ten times a minute.

Do not stop these movements under an hour, unless patient breathes. Be careful not to interrupt the first short natural breaths. If they be long apart, carefully continue between them the bellows-blowing movements as before.

Though the main reliance is on artificial respiration, fresh air should be admitted by the door, window, or fan; stimulating applications applied to the surface, and cold water to the face and head. The patient should be everted, so as to facilitate the flow of blood from the abdominal vessels to the heart. If a galvanic battery be at hand, it should be resorted to among other possible means of restoring animation, applying the positive pole of the battery to the back of the neck, and the negative pole to the end of the breast-bone, breaking and renewing the current about fifteen times per minute.

As soon as the patient can swallow, give brandy and ammonia. Efforts at resuscitation should not cease until death is evidently beyond all question.

OLEUM CAJUPUTI.

OIL OF CAJUPUT.

Botany.—The volatile oil of the leaves of *Melaleuca Minor*, belonging to the Natural Order *Myrtaceæ*—the Myrtle order. Imported from Batavia and Singapore.

Extraction.—Rumphius states that the leaves are gathered on a warm day, and placed in a sack, where they become hot and damp. They are then macerated in water, and left to ferment for a night, and afterwards submitted to distillation.

Characters.—Transparent, limpid, of a pale-bluish or myrtle-green colour, having a strong, penetrating and agreeable odour, resembling that of camphor, rosemary and cardamoms combined, and of a warm camphoraceous taste. Sp. gr. 0·914 to 0·930. Soluble in alcohol.

Physiological Effects and Therapeutics.—A diffusible stimulant, anti-spasmodic and diaphoretic. It is a medicine of much power and value. From the ordinary distilled oils (such as those derived from labiate plants and the umbelliferous fruits) it is distinguished by its strong influence over the nervous system, as evinced by its antispasmodic qualities and the greater diffusibility of its stimulant properties. It is allied to valerian, between which and camphor it ought to be placed in a physiological classification, but in large doses it does not disorder the mental faculties as those medicines do.

In neuralgic affections it may be beneficially employed externally and internally, but its use is interdicted when the neuralgia is connected with an inflammatory condition.

In toothache, a small piece of cotton saturated with the oil, and introduced into a carious tooth, is stated to be an efficacious remedy.

Dose.—1 to 5 minims.

OLEUM CARYOPHYLLI.

OIL OF CLOVE.

Botany.—A volatile oil obtained from the dried unexpanded flower buds of *Caryophyllus Aromaticus*, belonging to the Natural Order *Myrtaceæ*—the Myrtle order. Cultivated in the East and West Indies, Mauritius, &c.

Properties and Uses.—Aromatic and stimulant.—In toothache a drop or two upon cotton, introduced into a carious tooth, is a popular remedy which frequently affords relief.

OLEUM CROTONIS.

CROTON OIL.

Botany.—Expressed from the seeds of *Croton Tiglium*, a native of India and Ceylon, belonging to the Natural Order *Euphorbiaceæ* —the Euphorbium or Spurgewort order.

Physiological Effects and Therapeutics.—This oil is a drastic cathartic, and very speedy in its action. It is given in doses of from ½ to 3 drops.

Being uncertain in its action it should be given with caution, and avoided in cases of extreme debility, and in inflammatory conditions of the digestive organs. In neuralgia, tic-doloureux, and sciatica, it is said by some to possess a specific power, apart from its purgative action ; also in tic-doloureux arising from dyspepsia.

Externally, as a counter-irritant, it may be diluted with olive oil or soap liniment.

Dose.—⅓ to 2 minims in the form of pill, or placed on the back of the tongue.

Andidotes.—Olive oil, mucilage, &c.

OLEUM EUCALYPTI.

EUCALYPTUS OIL.

Botany.—The *Eucalyptus Globulus*, or blue gum tree, belongs to the Natural Order *Myr-*

taceæ — the Myrtle order, a native of Tasmania, introduced into Europe, in 1856, and has since then been very extensively planted in the southern part of Europe, in Northern Africa, in the Southern United States, and in California.

Chemistry.—The leaves only are used, and those only of older trees. They have a peculiar balsamic odour, and an aromatic, bitterish, pungent taste, followed by a sensation of coolness. They are of a pale, yellowish-green colour, and contain numerous pellucid oil-glands. The principal constituents of these leaves are tannin and a volatile oil. Faust and Homeyer obtained from the oil about 60 per cent. of a *terpene*, $C_{10}H_{16}$, boiling between 342° and 347° F.; 30 per cent. of *cymol*, $C_{10}H_{14}$, the remainder being a *terpene*, boiling at 302°, and an oxygenated compound, probably $C_{10}H_{16}O$, which they named eucalyptol. Cloëz's compound of the same name is a mixture of the first two hydrocarbons, which rapidly combine with oxygen. It has recently been asserted that the commercial oil of eucalyptus is prepared in Australia from the leaves of the more accessible *Eucalyptus Amygdalina.* The oil is soluble in alcohol, and in paraffin.

Physiological Effects and Therapeutics.—The oil when taken internally excites a sense of warmth in the fauces and stomach, with increased flow of saliva; in doses of 20 drops the oil causes general stimulation and a feeling of lightness; while, in excessive doses, there is more or less muscular paresis without mental depression, which is easily dissipated by coffee or alcohol.

The oil is an effective deodorizer, and a preventative of animal and vegetable putrefaction. It is not an irritant, and may be freely applied to suppurating surfaces, abscesses, necrosis, &c., hence its value in ulcers of the mouth, suppuration of the tooth pulp, chronic alveolar abscess, &c. For chronic alveolar abscess make a piston by winding cotton fibres around a suitable instrument and saturate it with eucalyptus oil. With this, as much as possible should be forced into and then pumped from the abscess, either directly or through the pulp canal of the tooth. By repeating this operation several times, nearly the whole of the contents of the sac will be removed. After this a little creosote may be injected into the abscess, the roots filled with a pledget of cotton, and the cavity sealed up. In two or three days the temporary stopping and dressing should be removed, and, if necessary, the same treatment repeated. Or, as mentioned under the heading of *Iodoformum*, page 197, that substance may be used in conjunction with eucalyptus oil as a dressing for pulp canals.

Apart from its antiseptic properties, eucalyptus oil is said to be a local anæsthetic, lulling the sensibility of aching teeth and sensitive dentine.

It also possesses astringent and balsamic properties, and an aqueous solution of the tincture may be used in cases of slight hæmorrhage, mucous discharges, ulcerating and spongy gums.

Dose.—Of the oil, 2 to 5 drops; tincture, 15 minims.

OLEUM MORRHUÆ.

COD LIVER OIL.

Obtained from the livers of the cod (*Gadus Morrhua*) and others of the family *Gadidæ*.

Characters and Tests.—Pale yellow, with a slight fishy odour and taste. A drop of sulphuric acid added to a few drops of the oil on a porcelain slab should develop a violet colour, which soon passes to a yellowish or brownish-red.

Preparation.—The livers are obtained as fresh as possible, and submitted to careful inspection; the inferior ones being removed, the remainder are carefully cleaned, cut open, and washed two or three times in cold water. They are then exposed to a steam heat not exceeding 180° F. The oil rises to the surface, and is removed. In order to congeal and separate the more solid fat (margarine) it is exposed to a temperature of 50° F., and then filtered.

The darker varieties are obtained either at a higher temperature, or from livers in which putrefaction has made more or less progress. Chemical analysis lends no support to the opinion, at one time entertained, that the brown oil is superior as a therapeutic agent to the pale oil, for no substances have been discovered in the darker oil which would confer on it superior activity as a medicine. The pale oil is more readily tolerated by the stomach.

Physiological Effects and Therapeutics.—In scrofulous and tubercular diatheses, and the various diseases in which these states of the constitution are manifested, cod liver oil is a remedy from which, as a general rule, the greatest good may be anticipated. It is a valuable adjunct to arsenic, &c., in scrofulous affections of the joints and bones, and is a remedy on which much reliance may be placed.

In rachitis, Dr. Bennett considers it the most efficacious of all remedies. Many forms of neuralgia which resist quinine and other ordinary remedies will sometimes yield to the plentiful ingestion of fat as an article of diet. Of these fatty remedies, cod liver oil holds the highest rank.

It should be administered immediately before or after meals, and may be given with orange wine, or a mixture containing tincture of orange and a little dilute phosphoric or nitric acid, in hot milk or coffee, or in the form of capsule.

According to Dr. Ringer, a little salt taken immediately before or after the oil often removes the taste, and prevents nausea.

Dose.—1 drachm to 1 ounce.

OLEUM SANITAS—See *Sanitas.*

OPIUM.

OPIUM.

Botany.—Obtained from the *Papaver somniferum*, an annual belonging to the Natural Order *Papaveraceæ*—the Poppy order.

General Characters.—Irregular lumps, weighing from four ounces to two pounds; enveloped in the remains of poppy leaves, and generally covered with the chaffy fruits of a species of rumex; when fresh it is plastic, tearing with an irregular, slightly moist, dark brown surface, shining when rubbed smooth with the finger, having a peculiar odour and nauseous taste.

Preparation.—Towards evening, incisions are made into the half-ripe capsules of the poppy, care being taken not to penetrate the interior. In Asia Minor the incision is made partly around the middle of the capsule, or carried in a spiral line from below upwards. In India the capsule is scarified vertically from apex to base, and the operation repeated at intervals of a few days, occasionally as many as six times. A milky juice exudes, and concretes upon the capsule in little tear-like masses, which are removed early in the morning; the separate portions, or tears, are either merely put together, or worked up into one homogeneous mass. When collected, it is dried in the shade, or in a warm and airy room.

Physiological Effects and Therapeutics.—In sciatica, tic-douloureux, and other neuralgic affections, Opium, either internally administered or locally applied, is occasionally of great service; but both these modes of use are far inferior to morphia hypodermically administered.

In convulsions in children over four months old, when due to teething, Opium has been administered in *small* doses prior to lancing the gum. If younger than four months, one grain each of Bromide of Potassium, Bicarbonate of Soda, and Hydrate of Chloral, mixed, may be given in warm sweetened water, and repeated every hour. To lance the gum before obviating the consequent pain by Opium, or similar agent, would probably cause another convulsion.

In toothache, a piece of solid Opium, or cotton saturated with the tincture, or the wine of Opium, introduced into a carious tooth frequently affords relief.

In ptyalism, Opium has been given internally with a view of arresting the excessive discharge. A case is recorded where a patient was profusely salivated, and every means had failed to diminish the flow of saliva, until Opium (gr. i every 4 hours) was given, when almost immediately a cessation of the excessive secretion ensued.

Great caution should be observed in the administration of Opium. It is interdicted in some diseases of the respiratory organs, &c.

Some persons are peculiarly susceptible to its action, and are unable to take even the smallest dose. Infants and children bear its exhibition badly; even two or three drops of the tincture have been known to produce a fatal result.

As a benumber or topical anodyne, it is much inferior to aconite; hence in neuralgia the latter is greatly to be preferred.

Dose.—¼ to 3 grains.

Antidotes.—See *Morphia.*

PAPAVERIS CAPSULÆ.

POPPY CAPSULES.

Botany.—The nearly ripe dried capsules of the White Poppy, *Papaver somniferum*, belonging to the Natural Order *Papaveraceæ* —the Poppy order.

Physiological Effects and Therapeutics.—Sedative anodyne, possessing the properties of Opium in a milder and varying degree. For fomentations, two ounces to a pint and a-half of water boiled to one pint. This is frequently recommended, to be used hot, in cases of pain after tooth extraction.

PEPSINA.

PEPSINE.

The digestive principle of the gastric juice of Mammalia. Obtained by digesting the mucous membrane of the sheep or pig in water at a temperature of 60°F., adding Neutral Acetate of Lead. By means of Sulphuretted Hydrogen the lead is precipitated, the Pepsine, held in solution, is obtained by evaporating the liquid at a temperature not exceeding 113°F.

Characters.—A light yellowish-brown powder, having a faint, but not disagreeable odour, and a slightly saline taste, without any indication of putrescence. Very sparingly soluble in water or spirit. It is decomposed at a temperature of 120°F., and then loses its digestive properties.

Therapeutic Use and Action.—Mr. Oakley Coles recommends it as an agent capable of restoring to a healthy condition a suppurating pulp. The Pepsine should be fresh, and made into a paste with water, containing 2 per cent. of Hydrochloric Acid; it is then placed in contact with the diseased pulp, sealed with wax, and renewed every third day. He asserts that, after a few applications, the offensive secretion ceases, and the pulp assumes a healthy condition, the dead part having been digested.

The action of Pepsine upon the tooth pulp has been experimentally studied by Dr. Arkövy (*Transactions of the Medical Congress*, 1881), and the following is a summary of his conclusions :—

Close to the spot of application of a small quantity ($\frac{1}{35}$ gr.) of Pepsine, a hyperæmia arises, which progresses to a dark inflammatory redness, having a defined line of demarcation from the apical portion of the pulp, which is not affected. The blood corpuscles are not ruptured, but, from the hygroscopic action of the Pepsine, the hœmoglobin becomes concentrated, and exhibits a deeper tint. There is also coagulation of the albumen. When a larger quantity ($\frac{1}{14}$ gr.) of the agent is used, there appears to ensue a fatty degeneration of the blood vessels and nerves throughout the pulp substance. Should periostitis ensue, this would rather be from collateral hyperæmia than from any direct action of the Pepsine. It has not any effect upon the dentine.

Dr. Arkövy concludes: "It would be advisable to use this agent in every case where rapidity is not essential. Special indications for its use would occur (1) in teeth of very young persons where a large aperture of the root canal may be supposed; (2) in persons who do not keep quiet, in whom a correct application of arsenious acid would be disturbed; (3) in teeth with distal cavities, where the margin of the cavity is under the level of the gum; (4) if the patient wants to interrupt the operation for two or three days."

PHOSPHORUS.

PHOSPHORUS.

Symbol.—P.

Characters.—A semi-transparent, colourless, wax-like solid, which emits white vapours when exposed to the air.

Preparation.—It is obtained by the action of sulphuric acid on powdered bone-ash, and subsequent distillation with charcoal, when carbonic oxide is formed and Phosphorus set free, which sublimes.

Physiological Effects and Therapeutics.—

Given to improve nerve tone, or to repair nerve tissue; it acts as a powerful general stimulant. It should be given with caution; combined with suet in the form of pill ($\frac{1}{30}$ grain) seems a convenient form of administration. Its chemical analogy to arsenic has led to its administration in cases of intercostal and trigeminal neuralgia with striking results.

Thorogood says:—"It is a medicine that may do good when gelseminum has failed. The cases in which Phosphorus is indicated are those of old standing neuralgia, upon which the curative powers of quinine, arsenic, and other reputed specifics have been fruitlessly exhausted."

Dose.—$\frac{1}{100}$ to $\frac{1}{30}$ grain.

PHYSOSTIGMATIS FABA.

CALABAR BEAN.

Synonyms.—Eseré nut. Chop nut.

Botany.—*Physostigma venenosum*, Natural Order *Leguminosæ*—the Legume or Bean order. Grows near the mouth of the Niger and Old Calabar River, in the Gulf of Guinea. A larger and more active bean is sometimes imported. Probably the produce of *Physostigma cylindrospermum.*

Physiological Effects and Therapeutics.—Its topical action is to paralyse the afferent and the efferent nerves supplying the part, causing dilatation of the capillaries. It has also been used successfully for traumatic tetanus. The tincture has been found useful topically as an anodyne in neuralgia and muscular rheumatism. Eserine is the active principle, and an ethereal solution is the best form in which it can be kept, as this alkaloid develops a red colouring matter—*rubreserine*—in presence of alkali, or in contact with the air. This latter substance and *calabarine*, the tetanising alkaloid, are both insoluble in ether. Poisoning by Calabar bean has been cured by subcutaneous injection of atropine.

Dose.—Of the powder of Calabar Bean, 1 to 3 grains; of the extract $\frac{1}{16}$ to $\frac{1}{4}$ grain.

PLUMBI ACETAS.

ACETATE OF LEAD.

Synonym.—Sugar of Lead.

Formula.—Old: $PbO,C_4H_3O_3+3HO$.
New: $Pb.2C_2H_3O_2.\ 3H_2O$.

Characters.—It occurs in white crystalline masses, which are slightly efflorescent, have an acetous odour and a sweet astringent taste.

Preparation.—By digesting finely powdered litharge in dilute acetic acid by the aid of heat, filtering and crystallizing.

Physiological Effects and Therapeutics.—In small doses it is sedative and astringent, lessening morbid mucous discharges and even diminishing natural secretions; whence it is useful in chronic diarrhœa and dysentery. In hæmorrhage, active or passive, whether proceeding from the lungs, the stomach, the nose, or other parts, acetate of lead proves signally useful.

Dose.—1 to 4 grains; this may be combined with ½ to 1 grain of opium.

PODOPHYLLUM PELTATUM.

MAY APPLE.

Synonyms.—Hog Apple, Mandrake, Wild Lemon.

Botany.—A perennial herbaceous plant, considered by botanists generally as belonging to the Natural Order *Ranunculaceæ*—the Crowfoot order,—but classed by others under *Berberidaceæ*—the Barberry order. It is common on the eastern side of North America. It has acquired some of its common names from the appearance of its fruit, which is as large as an egg, has a light-yellow colour, a pleasant sub-acid taste, and cathartic properties.

Chemistry. — It contains a considerable amount of *Berberine*, a bitter crystalline alkaloid destitute of purgative properties, and a resin termed *Podophyllin*, upon which its activity depends, and which varies in amount from 3½ to 5 per cent.

PODOPHYLLI RESINA.

RESIN OF PODOPHYLLUM.

Synonym.—Podophyllin.

Characters.—Varies in colour from a dark brown to lemon-yellow, according to the method adopted in its preparation. It is insoluble in either hot, cold, or acidulated water, but dissolves in alcohol and in alkaline solutions.

Preparation.—The root is exhausted by percolation with rectified spirit, and after distilling off the greater part of the spirit, the remaining fluid is slowly poured into water acidulated with hydrochloric acid. It is then set aside for twenty-four hours to deposit the resin, this is collected, washed with distilled water, and dried.

Physiological Effects and Therapeutics.—An active cathartic, applicable to cases where brisk purging is required; combined generally with henbane. Used in the place of calomel as a cholagogue.

Dose.—⅛ of a grain to 2 grains.

POTASSÆ BICARBONAS.

BICARBONATE OF POTASH.

Synonym.—Acid Carbonate of Potassium.

Formula.—Old: $CO,HO,2CO_2$.
New: $\mathbf{KHCO_3}$.

Characters.—Occurs in colourless right-rhombic prisms, which are not deliquescent, and have a saline, feebly alkaline taste.

Preparation.—By passing carbonic acid gas through an aqueous solution of carbonate of potash until crystals of the bicarbonate are formed; these are washed with twice their bulk of cold water, drained and dried (on filtering paper) by exposure to the air.

Physiological Effects and Therapeutics.—An antacid and diuretic. A dilute solution of this salt is very serviceable as a mouth wash when acid medicines are being taken. Also to women during the period of pregnancy, when the secretions of the mouth are frequently found to be unusually acid.

It is very beneficial in glandular diseases, excessive enlargement of the lenticular and glandular papillæ at the base of the tongue; and is a valuable agent, either alone or in conjunction with iodide of potassium, in rheumatic tooth-ache.

Dose.—10 to 40 grains.

POTASSA CAUSTICA.

CAUSTIC POTASH.

Synonyms.—Potash, Fused Potash, Hydrate of Potash, Oxide of Potassium.

Formula.—Old : HO,KO. New : **HKO.**

Characters. — Caustic potash is usually moulded for medicinal purposes into small sticks about the size of a pencil, which should be white, but are often greenish, bluish, or reddish brown from impurities; it quickly deliquesces when exposed to air, and, if pure, dissolves in rectified spirit. It is strongly alkaline.

Preparation.—Two pints of the solution of potash are evaporated in a silver or clean iron vessel, over a fire, until, the ebullition being finished, the hydrate of potash liquefies; this is poured into proper moulds, and, when it has solidified, and while it is still warm, is put into stoppered bottles.

Physiological Effects and Therapeutics.—Powerfully corrosive. The hydrate of potash, and also a mixture with an equal part of lime *(potassa cum calce)*, are used externally as caustics, for the formation of sloughs, for touching ulcers, &c. The advantage of the mixture is its being much less deliquescent than the hydrate alone; it is applied as a paste made with spirit. It dissolves animal tissues, forming a kind of soap with them. It is very difficult to circumscribe its action, and, therefore, requires to be applied with great caution.

POTASSÆ CHLORAS.

CHLORATE OF POTASH.

Formula.—Old: $KOClO_5$. New: $\mathbf{KClO_3}$.

Characters.—Colourless rhomboidal crystalline plates, having a cool, saline taste, sparingly soluble in cold water.

Preparation.—Obtained by passing a stream of chlorine gas (generated by the action of hydrochloric acid on black oxide of manganese) through a solution of carbonate of potash and slacked lime; subsequently boiling, filtering, and evaporating to crystallization.

Physiological Effects and Therapeutics.—Diuretic and stimulant. It becomes absorbed into the blood, and is eliminated by the kidneys. It appears to act as a diuretic and refrigerant, like nitrate of potash.

The supposition that it yields oxygen to the system is probably an error, for it has been found in the urine in an unchanged condition.

Dr. Horatio Donkin says, "That this salt, whether given alone or in combination with iron, possesses the very desirable property of controlling the various developments of the hæmorrhagic diathesis, and that its persevering administration will neutralise the constitutional taint on which these ailments depend."

In ulcerative and gangrenous stomatitis (cancrum oris) no internal remedy is generally so effectual as Chlorate of Potash.

In ulcerative stomatitis, Dr. West states that he relies upon it almost exclusively, and that there seems to be no form nor stage of the affection in which it is not useful; marked improvement seldom fails to be observed in two or three days, and, within ten days, a cure is generally effected. Three grains administered in sweetened water every four hours suffices for a child aged three years; 5 grains every four hours appear to answer as well as a larger dose for a child at eight or nine years. The bowels require to be regulated and the constitution supported.

Inflammation of the Gums (gingivitis) arising from teething will, according to Dr. West, generally yield to the Chlorate, 2 grains every four hours for a child of one year.

Cases of *Phagedenic Ulceration* and of *Secondary Syphilis* are recorded in which it was given, and a cure effected in a few weeks without the aid of mercury or iodine. To cachectic ulcerations, abraded surfaces, and in tonsilitis, the chlorate, finely powdered and locally applied, or in the form of a gargle, has proved very serviceable. In ptyalism it exercises a most beneficial influence.

Dose.—10 to 20 grains.

POTASSÆ HYPOPHOSPHIS.

HYPOPHOSPHITE OF POTASH.

Formula.—Old: $KO,PO,PO,2HO$.
New: $\mathbf{KPH_2O_2}$.

Characters.—It is uncrystallizable, very deliquescent, soluble in water and alcohol in nearly all proportions. When heated it evolves phosphuretted hydrogen and phosphorous acid, and is converted into phosphate of potash.

Preparation.—Obtained by adding carbonate of potash to solution of hypophosphite of lime so long as a precipitate of carbonate of lime is formed, then filtering and evaporating the solution to dryness, digesting the residue in alcohol (which dissolves the hypophosphite), and evaporating the filtered liquid to dryness *in vacuo* over sulphuric acid.

Physiological Effects and Therapeutics.—The medicinal properties are similar to those of hypophosphite of lime (Calcis hypophosphis), which see, page 139.

POTASSÆ NITRAS.

NITRATE OF POTASH.

Synonyms.—Saltpetre—Nitre.

Formula.—Old: KO,NO_5. New: $\mathbf{KNO_3}$.

Characters.—In white crystalline masses or fragments of striated six-sided prisms, colourless, and of a peculiar cool saline taste.

Purification.—The nitrate of potash employed in this country is obtained by the purification of the native nitres of India.

Physiological Effects and Therapeutics.—In moderate doses, Nitrate of Potash acts as a refrigerant, diuretic and diaphoretic.

It has been recommended in threatened alveolar abscess, the pulp cavity of the carious tooth being filled with the powdered salt, and protected by wax, or cotton and mastic.

In inflammatory sore throat, it forms a useful ingredient in gargles.

Dose.—5 to 20 grains as a refrigerant and diuretic.

POTASSÆ PERMANGANAS.

PERMANGANATE OF POTASH.

Formula.—Old : KO,MN_2O_7. New : $K_2Mn_2O_8$.

Characters.—It occurs in the form of dark purple, slender, prismatic crystals, inodorous, with a sweet, astringent taste, soluble in water.

Preparation.—Prepared from the black oxide of manganese with caustic potash, chlorate of potash, and dilute sulphuric acid.

Physiological Effects and Therapeutics.—Locally applied, in substance or strong solution, it acts as a stimulant and mild escharotic. It readily yields its oxygen to bodies having an affinity for that element ; hence its great value as a deodorizer ; yet while it destroys the odour of putrefactive substances, bacteria not only retain their activity, but appear to grow and flourish. It has been used with success in the treatment of fœtid and gangrenous ulcers, abscesses, and wounds of all kinds; as an antiseptic to the pulps of teeth which have become disorganised; and it removes the fœtor of breath arising from local causes. It forms a useful gargle in ulcerated sore throat.

Applied in powder to a carious tooth, it is said sometimes to cure odontalgia.

The stains of Permanganate of Potash are removed by dilute muriatic acid.

POTASSII BROMIDUM.

BROMIDE OF POTASSIUM.

Synonym.—Hydrobromate of Potash.

Formula.—KBr.

Characters. — Colourless, cubical crystals, without odour, having a pungent saline taste; readily soluble in water, less so in spirit.

Preparation.—By adding bromine gradually, and in slight excess, to solution of potash; evaporating to dryness; reducing the residue to a fine powder, mixing with wood charcoal, and fusing; lastly, when cooled, dissolving out the salt with water, filtering and crystallizing.

Physiological Effects and Therapeutics.—Narcotic, anæsthetic, and sedative. Some forms of neuralgia are effectually relieved by full doses of the bromide when other remedies have failed. It averts and obviates irritability in teething, often preventing convulsions. In small doses or locally applied, it rapidly and completely diminishes for a time the sensitiveness of the pharynx and velum palati to such an extent that those parts may be tickled without exciting the least effort at deglutition. This circumstance has been taken advantage of in preparing patients for laryngoscopic examinations and operations, and also in lessening the difficulty of taking large plaster casts of the mouth in cases of cleft palate, &c.

Dose.—5 to 15 grains and upwards.

POTASSII IODIDUM.

IODIDE OF POTASSIUM.

Formula.—KI.

Characters.—Colourless, cubical crystals, which are generally semi-opaque. They are readily soluble in water, less so in spirit.

Preparation.—Prepared in a similar manner to bromide of potassium, with solution of potash, iodine, and wood charcoal.

Physiological Effects and Therapeutics.—Its properties are closely analogous to those of iodine. Like it, it occasionally produces headache, flushing of the face and gastric irritation; and when taken in too large doses, produces coryza, and in some cases salivation and emaciation of the testes and mammæ, but these effects are rare.

It often proves most serviceable in scrofulous affections. It has been found valuable in convulsions attendant on dentition, which amongst ill-fed children is often followed by hydrocephalus.

In syphilis the value of the iodide is universally recognised, but it is so in the secondary and tertiary or constitutional forms of the disease only; in nodes, caries, and necrosis, and also in periostitis, it holds a first place in our list of remedies; and though its effects are not so immediately manifest, it exercises a no less certain influence on syphilitic affections of the skin. It may be given with great advantage in affections of the nervous system of syphilitic origin, and in syphilitic cachexia. The dose in *these* cases, upon the authority of Sir H. Thompson, may be from 30 to 75 grs.; and upon the authority of Mr. Berkeley Hill 120 grs. three times a day.

It proves of service in painful neuralgic affections, dependent upon an inflammatory state of the nerve coverings; it is more especially useful when the pains are increased at night and by the heat of bed.

In face-ache, partaking more of a rheumatic than a neuralgic character, Sir T. Watson found the iodide in doses of five to six grains produce a speedy and permanent cure.

Looseness of teeth, depending upon periostitis of the alveolar process, known by the great pain, swelling and sponginess of the gums, is often effectually cured by the iodide.

Dose.—½ to 10 grains or more.

PYRETHRI RADIX.

PELLITORY ROOT.

Synonym.—Pellitory of Spain.

Botany.—The dried root of *Anacyclus Pyrethrum* belonging to the Natural Order *Compositæ*—the Composite order. Imported from the Levant, Barbary and Spain.

Characters. — A fusiform root, about the length and thickness of the little finger, having a thick brown bark, studded with black shining points; breaks with resinous fracture, and presents internally a radiated structure.

Physiological Effects and Therapeutics. — An energetic local irritant and sialogogue. Chewed, it causes pricking in the mouth, a flow of saliva and buccal mucus, and is said to relieve some rheumatic and neuralgic affections of the head and face; and also paralysis of the tongue and muscles of the throat. In relaxation of the throat and uvula it is employed in the form of gargle. Pellitory is not given internally.

The tincture is used to relieve tooth-ache.

PYROXYLIN.

PYROXYLIN.

Synonym.—Gun Cotton.

Characters.—Has the appearance of ordinary cotton, is highly electric on friction, insoluble in water. It explodes at a temperature of 300° F., leaving no carbonaceous residue. If the explosion be conducted on litmus paper the latter is reddened. If on starch paper moistened with iodide of potassium, the nitrous acid formed sets free the iodine, and produces the blue iodised starch.

It is readily soluble in a mixture of ether and rectified spirit, forming Collodion.

Preparation.—By immersing cotton in equal parts by measure of sulphuric and nitric acids, washing until the filtrate ceases to give a precipitate with chloride of barium, and then draining the product on filtering paper, and drying at a temperatnre not exceeding 212° F.

Uses.—Used in the preparation of Collodion.

QUILLAYA SAPONARIA.

QUILLAIA BARK.

Synonym.—Soap Bark.

Botany.—A tree belonging to the Natural Order *Rosaceæ* — the Rose order, Sub-order *Roseæ.* It is a native of Chili and Peru. The bark is imported in flat pieces, two or three feet in length, and several inches wide, being hard and tough, with a whitish inner surface.

Properties and Uses.—The bark contains a principle allied to Saponine, possessing the power of emulsifying gum-resins, and oils, and forming with them, after being mixed with water, permanent emulsions. The powdered bark acts as a sternutatory. Sometimes used in tooth washes, on account of its power of causing aqueous solutions to froth.

As a therapeutic agent this natural soap can be used in the form of infusion, tincture (1 of bark to 5 of proof spirit), or fluid extract.

Its use in chronic ulcers has been followed by excellent results. It is also a valuable remedy in arresting excessive secretion.

QUINIÆ HYPOPHOSPHIS.

HYPOPHOSPHITE OF QUININE.

Formula.—$C_{20}H_{24}N\ O_4PH_2O_2$.

History and Characters.—It was first prepared under the direction of Dr. Churchill by Swann of Paris in 1856. As prepared by him this salt is an amorphous substance of honey-like colour, very soluble and deliquescent, of an intensely bitter taste. It has the consistence of soft wax, takes fire when heated, and burns like resin. This is a different compound from that met with in the trade under the same name, which is obtained by double decomposition between hypophosphite of lime or baryta and sulphate of quinine. It is in white needles, and is most frequently an impure product, consisting of a mixture of Hypophosphite of Quinine, sulphate of quinine, sulphate of lime or baryta. Dr. Churchill says the only preparation fit for medicinal purposes is that prepared by Swann.

Preparation. — By dissolving the alkaloid quinia in hypophosphorous acid, or by decomposing sulphate of quinia with hypophosphite of baryta, filtering and evaporating the solution.

Physiological Effects and Therapeutics.—It has a lower activity than the other hypophoshites,which is easily accounted for by the small portion of acid it contains. And, in cases where the hypophosphites are indicated, this preparation is useful when the other salts are found too active.

One grain of Hypophosphite of Quinine is equal to rather more than $\frac{1}{20}$ of a grain of phosphorus.

Dr. Churchill believes the Hypophosphite of Quinine will in time be looked upon as the most efficient preparation of this alkaloid.

In the teething of children he seems to give preference to the lime preparation of the hypophosphites, and speaks of it producing a *heroic* effect, and, if properly used, will act as a preservative agent against all the accidents of this difficult period of life. When given to teething children who are pale, peevish, sad, emaciated, without appetite or strength, suffering from fever and diarrhœa, loss of sleep, and apparently in imminent danger of convulsions, he has never seen a single case where the whole of these symptoms have not yielded to a few doses of the syrup, and the evolution of the teeth afterwards proceed as in perfect health.

Dose.—1 to 3 grains.

QUINIÆ SULPHAS.

SULPHATE OF QUININE.

Formula.—Old: $C_{40}H_{24}N_2O_4HO,SO_3+7HO$
New: $(C_{20}H_{24}N_2O_2)2H_2SO_4.\ 7H_2O$.

Characters.—Filiform, silky, snow-white crystals of a pure intensely bitter taste, sparingly soluble in water, yet imparting to it a peculiar bluish tint as seen by reflected light; dissolves readily in dilute sulphuric acid.

Preparation.—Prepared from the yellow Cinchona Bark, which is exhausted by maceration and percolation with dilute hydrochloric acid. The solution so obtained is treated with a slight excess of solution of soda ; the precipitated quinia is washed, and then very nearly dissolved in dilute sulphuric acid ; a neutral liquid is thus obtained, which is filtered, concentrated and crystallized. The crystals should be dried on filtering paper without heat.

Physiological Effects and Therapeutics.—A valuable tonic and anti-periodic, possessing in an eminent degree the properties for which cinchona has been justly celebrated.

In tic-doloureux and other neuralgic affections, it holds a foremost place in our list of remedies. In neuralgia of malarial origin, there can be no doubt of the value of quinine. It may be given in full doses (grs. 5 to 20) shortly before the time at which the attack of pain is expected ; but if after three or four doses a decided improvement is not effected, the probability is great that the neuralgia is not malarial. In a certain number of non-malarial cases also, quinine produces a good effect, 2 to 3 grs. thrice daily being the largest quantity which is likely to be of any use.

In cancrum oris, when the constitution requires tonics and stimulants in order to support the strength, Dr. Graver strongly recommends quinine.

In aphthous ulcerations and scurvy, where the constitution is much debilitated, it is highly serviceable.

When the bitter taste is objectionable, as in the case of young children, amorphous quinine, which is insoluble in saliva, but readily so in gastric juice, may be advantageously substituted, and even when given to adults in large doses, it is perhaps better to give it in suspension, as the bitterness is not then so intense.

Dose.—1 to 10 grains, or more.

RESORCIN.

Formula.—C_6 (OH) HH (OH) H_2., or $C_6H_6O_2$.

Preparation.—Formerly obtained from Galbanum; now, by mixing with chalk the waste and mother liquor left in making brazilin from Brazil wood, evaporating to dryness and subjecting the residue to dry distillation. Or it may be made by passing the vapour of benzol through sulphuric acid. It is used in large quantities in the manufacture of eosine and other coal-tar dyes.

Characters.—A neutral, crystalline body, soluble in water, alcohol, ether, and, in fact, in most fluids, with the exception of chloroform and bisulphide carbon. It is at first colourless, but, on exposure to the air, it quickly acquires a pinkish colour. It melts at 210°F., boils at 570°F., and distils without residue. It has a strong, peculiar, sweet, and somewhat unpleasant irritating taste. When thrown on the fire, it burns with a bright flame.

Physiological Effects and Therapeutics.—Resorcin is an antipyretic, antiseptic, antiferment, and a caustic. It exerts a powerful action on the nerve centres, producing epileptiform convulsions. In Germany it has been administered as an antipyretic in febrile diseases, acute rheumatism, erysipelas, &c. A 1 per cent. solution forms a valuable dressing to erysipelatous inflammation, wounds, ulcers, and abscesses, promoting healthy healing without irritation.

Ulcers of the gums and mucous membrane of the mouth which are invaded with micro-organisms, heal quickly after cauterisation with crystals of Resorcin. It is also recommended as a caustic for cancerous and syphilitic ulcers, and is said to destroy the diseased tissue thoroughly. It is reputed not to affect the substance of the teeth.

A 1 per cent. solution arrests almost all forms of fermentation. Blood, urine, infusion of pancreas, and other substances can be kept for an almost unlimited time by the addition of a few grains of this new antiseptic. Even when decomposition has already set in, it speedily arrests it. Resorcin being odourless, does not act by simply substituting one smell for another.

The following advantages over Carbolic Acid are claimed for it:—More soluble in water, almost destitute of smell, less irritating and its toxic action slight.

Dose.—1 to 3 grains in solution.

Antidotes.—Emetics, Olive Oil, Hypodermic injection of Morphia.

ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO

SANDARACH.

SANDARACH.

Synonym.—Juniper Resin.

Botany.—A resin obtained from the *Callitris quadrivalvis*, a plant belonging to the Natural Order *Pinaceæ* or *Coniferæ*—the Pine order. French Sandarach is the commercial name of the resin of the *Pinus Dammara.*

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Uses.—It is used as a substitute for mastic. Dissolved in spirits of wine (methylated), it is useful as a varnish for plaster models. If it be desirable to make the surface very hard, dilute some of the varnish with spirit (to render it more easy of absorption) and apply several coats until a smooth surface be obtained.

SANITAS.

Characters.—This substance is obtainable in the form of an Oil and an aqueous Fluid. Sanitas Oil is a yellowish-red oleaginous fluid, density 0.950 to 0·975, slightly inflammable, volatile, and having an aromatic, camphoraceous odour. Soluble in alcohol and ether. Sanitas Fluid is a watery solution, and may be diluted with water in any proportion.

Chemistry.—The products of the oxidation of oil of turpentine; the "Sanitas Oil" containing camphoric peroxide and a substance which corresponds in all its properties with peroxide of hydrogen (H_2O_2), which is also one of the active principles of the aqueous Fluid. The Oil is said to possess oxidising powers equal to a ten volume solution of peroxide of hydrogen, and may be regarded as an extremely concentrated form of the aqueous solution or Fluid. With potassium iodide, ferrous sulphate, and starch it gives a strong reaction of peroxide of hydrogen.

Preparation.—By exposing a large quantity of turpentine floating upon water to a blast of hot air, the turpentine is oxidised and increased in density, giving rise to the production of camphoric peroxide, camphor, and various other substances of an oxidised nature. Some of these products, notably peroxide of hydrogen, camphoric acid and thymol, dissolve in the water forming the Sanitas Fluid. Floating upon the surface of the solution is the oxidised oil of turpentine, Sanitas Oil.

Therapeutic Action and Uses.—Antiseptic, disinfectant and non-poisonous. Its antiseptic properties are chiefly due to the camphoraceous compounds, and its disinfectant or germicidal virtues depend largely upon the peroxide of hydrogen, or corresponding camphoric peroxide. Its antiseptic intensity is said to equal carbolic acid, thymol and iodoform, while, at the same time, it is neither caustic nor irritating. It is recommended as a dressing to wounds, ulcers and suppurating surfaces; also, 1 part of "Fluid No. 1" to 10 parts of water, as a gargle in ulcerated throat, or from 10 to 20 drops to 1 ounce of water as a pleasant deodorising mouth wash.

The Oil has been successfully used in the treatment of suppurating pulps and alveolar abscess, and the flavour is generally more agreeable than either carbolic acid or eucalyptus oil. Mr. Charters White suggests adding a little of the Oil to the solution of mastic, as cotton saturated with this mixture does not become offensive when used as a temporary dressing to the tooth.

SAPO DURUS.

HARD SOAP.

Prepared by boiling olive oil with a solution of soda till the whole forms a thick viscid solution. The alkali is added gradually, and when saponification is complete, the soap is separated from the excess of alkali, the glycerine, and superfluous water, by the addition of common salt.

The soap rises to the surface, and is ladled off into moulds, where it is stirred to promote the separation of the liquid.

It is an antacid, and on that account is often introduced into tooth powders.

Dissolved in methylated spirit, it forms an excellent varnish for plaster models in casting bites.

SEPIA OFFICINALIS.

COMMON CUTTLE FISH.

Natural History.—Belonging to the Class *Cephalopoda*—Cephalopods,—a class of molluscs which have the body enclosed in a bag (mantle). Head protruding from the bag. The substance called *os sepiæ*, or cuttle-fish bone, is an oval or oblong calcareous bone (sometimes termed shell) deposited in the mantle of the animal.

Characters and Uses.—Os sepiæ has a cellular texture, and is so light as to float on water; when dried and ground into powder, it constitutes *pounce.* It enters into the composition of tooth powders. It is employed for several purposes in the arts, as for polishing, forming moulds for small silver castings, &c.

SINAPIS.

MUSTARD.

Botany.—The seeds of *Sinapis alba* and *Sinapis nigra*, belonging to the Natural Order *Cruciferæ*—the Cruciferous or Cabbage order.

Characters.—Small round seeds, yellow inside. Those of Sinapis alba are yellow outside, those of Sinapis nigra are black and somewhat smaller.

Chemistry.—Its activity is chiefly due to the essential oil, produced from the black Mustard by the mutual action of sinigrin and myrosin in the presence of cold water.

Physiological Effects and Therapeutics.—In small doses, it is a stimulant. In doses of from one to three teaspoonfuls, it is an efficacious emetic, effectually clearing out the stomach without producing any great amount of subsequent depression. Externally, applied in the form of poultice, it is irritant, and if left in contact with the skin for a long period, causes vesication. It should always be made with cold water.

In inflammation of the tonsils, sinapisms to the throat are very useful.

In toothache, face-ache, and neuralgic affections of the head and face, a sinapism over the seat of pain often affords great relief.

Mustard leaves are an excellent substitute for the ordinary mustard poultice, being cleanly and more convenient.

SIPHONIA ELASTICA.

ELASTIC GUM.

Synonym.—Caoutchouc, or India Rubber.

Botany.—A concrete juice obtained by incisions from the *Siphonia Elastica*, a plant belonging to the Natural Order *Euphorbiaceæ*—the Euphorbium or Spurge family. A native of Brazil and Guiana. The best India rubber used in this country is obtained from *Hevea Brasiliensis* and allied species.

The substance called vulcanized india rubber is a compound of sulphur and caoutchouc combined by the agency of heat; by a protracted and increased heat, this is converted into a horny substance, called vulcanite.

Solvents.—Ether (washed), benzine, chloroform, tar, naphtha, &c.

SODÆ BIBORAS.

BIBORATE OF SODA.

Synonym.—Borax.

Formula.—Old : $NaO,2BO_3+HO$.
New : $Na_2B_4O_7\ 10H_2O$.

History.—It occurs in a native state, and is exported from the East Indies under the name of Tincal.

Characters.—In transparent, colourless crystals, soluble in water, still more so in glycerine; insoluble in spirit. It has an alkaline reaction; when in solution, it absorbs carbonic acid; dissolves fibrine, albumen, casein, and uric acid.

Preparation.—It is made artificially in Tuscany by boiling together in proper proportions boracic acid and carbonate of soda.

Physiological Effects and Therapeutics.—Refrigerant, diuretic, and emmenagogue. Its action is very similar to that of carbonate of soda. Its curative properties in aphthous affections are very questionable; its mild alkaline qualities may improve the condition of the skin and mucous surfaces.

Other Uses.—Plaster casts may be rendered extremely hard by its use, thus: thoroughly dry the cast, then immerse it for a few minutes in a boiling solution of borax and water, and set aside to cool. It is also employed as a flux in fusing and soldering metals.

SODÆ BICARBONAS.

BICARBONATE OF SODA.

Synonyms.—Hydrogen Sodium Carbonate,

Acid Carbonate of Sodium, Sesquicarbonate of Soda.

Formula.—Old : $NaO,HO,2CO_2$.
New : $NaHCO_3$.

Preparation.—By passing carbonic acid gas into a mixture of carbonate and dried carbonate of soda until it is no longer absorbed. The damp salt formed is then shaken with half its weight of distilled water ; the insoluble portion is drained and dried by exposure to the air.

Physiological Effects and Therapeutics.—Neuralgia connected with acidity of the stomach is often speedily relieved by a full dose of the Bicarbonate of Soda. Aphtha in children is often relieved by a few doses in combination with a little rhubarb. A small portion put into a carious tooth often relieves toothache.

It is very useful in neutralising the acid secretion of the mouth, whether arising from pregnancy or other causes. It is also a desirable adjunct to tooth powders.

Dose.—10 to 40 grains.

SODA CAUSTICA.

CAUSTIC SODA.

Synonym.—Hydrate of Sodium.

Formula.—Old: NaO, HO. New : $NaHO$.

Characters.—Greyish-white, hard, very alkaline and corrosive, but less caustic and deliquescent than the hydrate of potash.

Preparation.—Similar to that adopted for caustic potash, substituting carbonate of sodium for carbonate of potassium.

Physiological Effects and Therapeutics.—Similar to those of caustic potash. (See page 250.)

SODÆ HYPOPHOSPHIS.

HYPOPHOSPHITE OF SODA.

Formula.—Old: $NaO,PO\ 2HO$.
New: $\mathbf{NaPH_2O_2}$.

Characters.—It is very soluble both in alcohol and water, and, when carefully evaporated, may be obtained in prismatic crystals which are very deliquescent.

Preparation.—This salt is prepared by adding carbonate of soda in solution to solution of hypophosphite of lime as long as a precipitate is formed, separating the soluble hypophosphite of soda from the precipitate, and evaporating the solution to dryness, digesting the residue in alcohol, which dissolves the hypophosphite; lastly, evaporating carefully in vacuo to crystallization. It is said to be subject to explosion if much heat be applied in the evaporation, evolving phosphuretted hydrogen.

M. Boymond asserts that Hypophosphite of Soda prepared from the hypophosphite of lime, contains an appreciable quantity of phosphite of soda. He has obtained this salt entirely pure, by employing in the place of hypophosphite of lime a clear solution of hypophosphite of baryta.

Physiological Effects and Therapeutics.—Its medicinal properties are similar to those of hypophosphite of lime, which see, page 139.

SODÆ PHENAS.

PHENATE OR CARBOLATE OF SODA.

Formula.—NaC_6H_5O.

Characters.—A soapy mass of indistinct crystals, or in tufts of acicular crystals, more or less of a pinkish white colour, resolved by heat into an oily liquid. Readily decomposed. Insoluble in soda-ley; soluble in water, also in creosote, forming a thick mass.

Preparation.—May be obtained by mixing caustic soda with carbolic acid and a little water, and evaporating. It is met with in commerce in solution of a definite strength, and in this form it is generally used.

Physiological Effects and Therapeutics. — Hæmostatic, antiseptic, and disinfectant; it is highly recommended as an astringent and styptic application to check excessive bleeding after tooth extraction, and prevent subsequent soreness of the gum. It causes rapid absorption of the extravasated blood, thereby preventing fœtor of the breath, and facilitating the speedy closing, healing and hardening of the gum.

It is said to relieve almost magically the *after-pains* of extraction. It may be applied upon cotton, over and around the alveolus, but so placed as not to interfere with the closure of the cavity by the clot, and the kind and prompt healing likely to result from its retention. It is preferable to the ferruginous preparations as a hæmostatic ; it is not escharotic, but sedative and antiphlogistic in its action. As a mouth wash it is highly recommended in cases of soft, spongy, or swollen gums, which bleed on the slightest touch. Used in various degrees of strength from its full strength to 1 in 12 of water.

SPILANTHES OLERACEA.

PARA CRESS.

Botany.—This annual is indigenous to South America and India, belonging to the Natural Order *Compositæ*—the Composite order.

Characters.—The herb is collected while flowering. It has a peculiar, not agreeable odour, and, when masticated, a sharp and biting taste followed by a copious flow of saliva. Lassaigne ascertained the presence of tannin and a volatile oil; Walz obtained a crystalline principle, *spilanthin*, which is not precipitated by acetate of lead, is insoluble in water, and, when its solutions are rapidly evaporated, is converted into a resinous mass.

Physiological Effects and Therapeutics.—Every part of this plant has an aromatic and acrid taste which excites free salivation. In Europe it has been used for the relief of tooth ache—a tincture made from the plant has been in use under the name of *Paraguay-Roux.*

When the aching tooth is hollow, the tincture is applied to the carious cavity on cotton, otherwise it is painted or rubbed upon the adjacent gum ; it does not act as an irritant upon the latter. 15 to 30 minims to an ounce of water may be used as a stimulating mouth wash.

SPIRITUS ÆTHERIS NITROSI.

SPIRIT OF NITROUS ETHER.

Synonym.—Sweet Spirit of Nitre.

A spirituous solution containing Nitrous Ether (Nitrate of Ethyl). $C_4H_5ONO_3$ or $\mathbf{C_2H_5NO_2}$.

Characters.—Inflammable, transparent, mobile, and nearly colourless, with a very slight tinge of yellow, of a peculiar penetrating apple-like odour, and sweetish, cooling, sharp taste Sp. gr. 0·845. Should not effervesce with bicarbonate of soda.

Preparation.—Prepared by distilling at a temperature between 170 and 180°F., a mixture of nitric acid, sulphuric acid, and rectified spirit.

Physiological Effects and Therapeutics.—Refrigerant, diuretic, and diaphoretic. It is chiefly used as an adjunct to other remedies of the same class. To obtain its diaphoretic and refrigerant effects, it is best combined with liquor ammoniæ acetatis ; to obtain its diuretic action, with squills, &c.

Dose.—½ to 2 drachms.

STRYCHNOS NUX VOMICA.

NUX VOMICA.

Synonym.—Koochla, or Poison Nut Tree.

Botany. — The seeds of *Strychnos Nux Vomica*, belonging to the Natural Order *Loganiaceæ*—the Spigelia or Strychnos order. Growing in, and imported from, the East Indies.

Characters.—The seeds are nearly circular, about an inch in diameter, flat, or very slightly convex on the dorsal surface, and are usually surrounded by a filiform annular stria. In the centre of the ventral surface is the rounded hilum or umbilicus.

Physiological Effects and Therapeutics.—The seeds and the bark are powerful stimulants of the nervous system and spinal cord. Their activity resides in the alkaloids strychnia and brucia. In large doses it causes twitching of the muscles, followed by tetanic rigidity and death from apnœa; paralysed parts are more readily affected than those which are sound. It is much used in the treatment of paralysis, especially when depending on *lead* poisoning: also in mercurial paralysis, and in that resulting from rheumatism. It has been used in neuralgia with good effect.

Some constitutions are peculiarly susceptible to its action; hence its administration should always be commenced with the smallest doses, and gradually and cautiously increased, its effects being carefully watched.

Muscular stiffness or convulsive twitchings in the extremities is a certain indication that the remedy has been carried far enough, and should at once be discontinued. During its exhibition the use of tobacco should be abandoned, their actions on the system being antagonistic.

Dose.—Tincture of nux vomica, 5 to 20 minims; strychnine, 1-30th of a grain.

Antidotes.—Evacuate the contents of the stomach. Infusion of tobacco; Extract of Conium; Hydrate of Chloral.

THYMOL.

THYMOL.

Formula.—$C_{10}H_{14}O$.

Botany. — Thymol occurs together with Thymene and Cymene in the volatile oil of the *Thymus Vulgaris*, or Common Thyme, a member of the Natural Order *Labiatæ* or *Lamiaceæ*—the Labiate order. The *Monarda Punctata*, or Horse Mint, belonging to the same order, likewise contains it, as does also the *Ptycholes Ajowan*, an East Indian plant belonging to the natural order *Umbelliferæ.*

Characters. — In transparent rhomboidal plates, having the odour of Thyme, soluble in water, slightly deliquescent, and having a peppery taste.

Preparation.—Sometimes it crystallises out spontaneously from the oil. It may be separated by agitating the Oil of Thyme with solution of soda, and supersaturating the alkaline liquid with hydrochloric acid.

Physiological Effects and Therapeutics.—Stimulant to capillaries ; also useful in peripheral neuralgia. Its powerful antiseptic properties render it a useful agent in the treatment of suppurating pulp and alveolar abscess. It arrests the putrefaction of animal matters.

TONGA.

History.—The drug called Tonga was brought to Professor Ringer by a gentleman named Mr. Ryder, residing at Fiji, as a reputed remedy among the natives for neuralgia. Mr. Ryder described the drug as a mixture, and knew nothing of its botany. It is met with in bundles and consists mainly of a fibrous substance, probably a root and the inner bark of two or more plants, the botanical sources of which are not definitely known ; but Mr. Holmes, of the Pharmaceutical Society, and others have examined various samples, the contents of which were not uniform. Mr. Holmes came to the conclusion that the fibrous portion of Tonga was a species of *Rhaphidophora* ; in all probability, the species yielding it is *Rhaphidophora Vitiensis.*

Use.—The bundle, without being unfastened, is to be steeped in half a tumbler of cold water for 20 minutes ; then squeeze the liquid from the bundle back again into the tumbler. Of this infusion take a claret glass

3 times a day, about half an hour before each meal. At the conclusion of this operation, which may be repeated as often as necessary, dry the bundle, and hang it up in a dry place to prevent its getting mouldy. Messrs. Allen and Hanbury have prepared a liquid extract containing one part of the drug in one part of the extract. Of this, Mr. Ryder recommends one drachm to be taken three times a day. He finds that it generally cures neuralgia by the second or third day. In eight or ten days the pain may return, when a few additional doses permanently remove the pain.

This remedy, whilst apparently highly useful in neuralgia, produces no toxic symptoms.

VALERIANA OFFICINALIS.

OFFICINAL VALERIAN.

Synonyms.—Common Valerian, Wild Valerian.

Botany.—An indigenous perennial, belonging to the Natural Order *Valerianaceæ*—the Valerian order. The roots of the wild plant growing on dry soil are to be preferred. As met with, they consist of short rhizomes with numerous radicles two or three inches long, of a light yellowish-brown colour, a strong, characteristic, and disagreeable odour, and a bitter, acrid, camphoraceous and nauseous taste.

Chemistry.—Its principal constituents are volatile oil and valerianic acid; it also contains a substance termed *valerianin*, and some resin.

Physiological Effects and Therapeutics.—Stimulant, antispasmodic, and vermifuge. It is said to be a useful adjunct to cinchona in intermittents. In whooping cough and laryngismus stridulus, Dr. G. Hill speaks highly of the value of Valerian. In neuralgia, particularly when associated with hysteria, the ammoniated tincture, combined with guaiacum, sometimes exercises a favourable influence.

Dose.—Infusion, 1 to 2 ounces; tincture, 1 to 2 drachms; ammoniated tincture, ½ to 1 drachm.

VASELINE.

Synonyms.—Cosmoline, Gelatum Petrolei, Saxoleum Suspissatum, Unguentum Petrolei.

Characters.—A residuum from the distillation of petroleum, or rock oil, of a yellow colour; when treated with animal charcoal it is decolourised.

Freely soluble in ether, slightly in alcohol, insoluble in water. Mixes in all proportions with fixed and volatile oils; it also mixes with glycerine, but separates on the addition of water. It does not form a soap with alkalies, and neither potash nor hydrochloric acid act upon it. It seems indifferent to reagents, and is not changed or made rancid by exposure to air.

Uses.—It is an admirable medium for ointments, for it does not change iodides of the metals nor the oxides of mercury, nor subacetate of lead. Citrine or nitrate of mercury ointment made with it keeps without the beautiful lemon colour being affected, even when largely diluted with it.

It may be made of any consistence by the addition of paraffin wax, and so be employed for cerates and ointments.

VERATRIA.

VERATRIA.

Formula.—$C_{32}H_{52}N_2O_8$.

Characters.—An alkaloid, not quite pure, obtained from the dried fruit (Cevadilla) of *Asagræa Officinalis*, the spike-flowered Asagræa, belonging to the Natural Order *Melanthaceæ*—the Colchicum order. It is a pale grey amorphous powder, odourless, but the minutest quantity producing intense irritation of the nostrils ; strongly and persistently bitter, and highly acrid ; insoluble in water ; soluble in spirit, ether, and dilute acids, leaving traces of resin, owing to the impurity of the alkaloid.

Concentrated sulphuric acid changes it first to yellow, then blood-red, and lastly to a violet colour.

Preparation.—The seeds are ground and thoroughly exhausted by rectified spirit. The alcoholic solution is concentrated, and, while hot, poured into cold distilled water to precipitate the resin, which is separated by filtration. To the filtered liquid, which contains the Veratria in combination with gallic acid, ammonia is added in slight excess, which combines with the gallic acid, setting the insoluble Veratria free. It is subsequently decolourized by animal charcoal, precipitated and dried.

Physiological Effects and Therapeutics.—Veratria is an irritant, and excites sneezing, vomiting, purging, violent twitchings, and convulsions, and afterwards great muscular weakness, with loss of electric irritability. The pulse is at first quickened and strengthened, then slowed, and afterwards becomes quick, weak, and irregular. The twitchings and convulsions are probably in part due to the effects on the muscles, and partly on the spinal cord.

Bezold and Hirt believe that Veratria, besides acting on the muscles, also paralyses the peripheries of the motor nerves. Applied to the skin, it causes numbness, and therefore paralyses the sensory nerves.

The susceptibility to its action varies, it in some persons readily producing numbness and a sensation of coldness, which may last several days.

Like aconite, it has a beneficial influence upon neuralgia of the fifth nerve.

As a remedy for neuralgia, Veratria is far inferior to aconite and its alkaloid aconitia. Waring says, "Occasionally it affords great temporary relief, but it often fails entirely; it is inferior in every respect to aconitia."

The ointment (the only form in which it is used) of the British Pharmacopœia (1 to 60) is not strong enough in facial neuralgia, and it is generally necessary to use it at least double that strength. Dr. Turnbull, who has largely employed Veratria ointment, uses it of the strength of 1 to 20, and sometimes even 1 to 12. The ointment of the United States Pharmacopœia is 1 to 24.

Care must be taken not to apply Veratria to a denuded surface, as it will excite much pain and inflammation.

ZINCI CHLORIDUM.

CHLORIDE OF ZINC.

Formula.—Old : $ZnCl$. New : $ZnCl_2$.

Characters.—A white, crystalline, semi-transparent mass, rapidly absorbing water if exposed to the air ; soluble in rectified spirit, ether, and water.

Preparation.—Obtained by the action of hydrochloric acid on granulated zinc, purifying the solution by adding solution of chlorine and carbonate of zinc, evaporating to a proper consistence, and pouring into moulds to solidify.

Uses.—A valuable escharotic to sensitive dentine, but, except in cases where rapidity of action is needed, carbolic acid is preferable in consequence of the severe dull pain caused by its application.

It is an excellent agent applied to teeth denuded of their enamel. Properly diluted, it is a valuable disinfectant.

ZINCI SULPHAS.

SULPHATE OF ZINC.

Synonym.—White Vitriol.

Formula.—Old : $ZnOSO_3+7HO$.
New : $ZnSO_4\ 7H_2O$.

Characters.—In colourless, transparent, prismatic crystals, with a strong metallic styptic taste; insoluble in alcohol, freely soluble in water.

Preparation.—Obtained by dissolving granulated zinc in dilute sulphuric acid, purifying the solution by means of chlorine and carbonate of zinc, evaporating and crystallizing.

Physiological Effects and Therapeutics.—Tonic, astringent, and anti-spasmodic, in doses of one grain, gradually increased. In doses of 10 to 20 grains it proves emetic, acting promptly and effectually, leaving little subsequent depression. In cynanche tonsillaris, when the abscess is so situated that it cannot be opened by the lancet, it has been proposed as an emetic, for under the exertion of vomiting the abscess will often burst; for this purpose nothing is better than Sulphate of Zinc. Externally and locally, its virtues are those of a stimulant astringent; it is commonly applied to quicken vital action as well as to check secretion. In gangrene of the mouth in children, this agent (20 grains), well incorporated with honey (1 ounce) forms a very useful topical application.

Dose.—As a tonic or an astringent, 1 to 2 grains; emetic, 10 to 30 grains.

ZINCI VALERIANAS.

VALERIANATE OF ZINC.

Formula.—Old : $ZnO, C_{10}H_9O_3$.
New : $Zn\ 2C_5H_9O_2$.

Characters.—It occurs in brilliant white, pearly, tabular crystals, having a slight odour of valerianic acid and a metallic taste. It is soluble in hot water and alcohol, only slightly so in cold water or ether.

Preparation.—By mixing nearly boiling solutions of sulphate of zinc and valerianate of sodium, allowing the mixture to cool, and skimming off the crystals that form. The mother liquor is evaporated at a temperature not exceeding 200°F. ; on cooling any other crystals that may have formed are removed. They are then collected on a filter, washed with cold water, and dried in the air on bibulous paper.

Physiological Effects and Therapeutics—Nervine tonic and antispasmodic. In neuralgia, this preparation affords great and permanent relief. M. Devay relates several instances in which it proved highly serviceable, and from which it appears that its curative powers are confined to those cases in which the disease is purely nervous, and to those neuralgic affections which accompany uterine derangements.

Dose.—½ to 6 grains or more, twice or thrice daily.

TABLE OF POISONS

WITH THEIR

ANTIDOTES, &c.

ACIDUM ARSENICUM.
ACIDUM ARSENIOUSUM.

Symptoms.—Faintness, nausea, burning pain in the epigastrium, vomiting, diarrhœa, thirst, a feeling of constriction in the throat, the heart's action becoming feeble, with quick and weak pulse; respiration painful and hurried, cold and clammy skin; death at times within twenty-four hours from collapse, with or without convulsions.

Antidotes.—1. Lime water. 2. Hydrated Magnesia. 3. Sesquioxide of Iron. 4. Animal Charcoal. Stomach-pump, emetics, milk, raw eggs.

Form of Exhibition.—1. A mixture of lime water and oil, or milk and lime water.

2. Light magnesia mixed with water.

3. Gelatinous hydrated peroxide of iron—the precipitate formed by adding ammonia, slightly in excess, to tincture of perchloride of iron, or solution of persulphate of iron. Sesquioxide of iron (ferri carbonas) mixed with water. Also, R. Tincturæ Ferri Perchloridi ℥j.

Sodæ vel Potassæ Bicarbonatis ʒj. Aquæ Fervens ℥iv. *Misce.*

4. Purified animal charcoal, common animal charcoal, ivory black.

ACID. CARBOLICUM.

Symptoms. — When swallowed it generally gives rise at once to pain in the stomach, whitening of the lips and mouth, and sometimes vomiting, shortly followed by stertorous breathing, coma and death. The pupils are contracted to a very marked degree. Death usually follows within a period of from a few minutes to 8 or 10 hours. The urine is usually dark-coloured.

Antidotes.—Saccharate of lime, lime water, and precipitated carbonate of lime have each been suggested as antidotes for Carbolic Acid. The precipitated carbonate of lime is not really an antidote, any good there is in it simply arises from its absorbent action. Lime water is of little service as it contains so little lime. The saccharate of lime (see Calx, page 306) combines with the acid forming a non-poisonous salt. Sulphate of soda (Glauber Salts), in doses of 75 to 120 grains in 6 ounces of water for adults, for children a proportionate quantity, is useful in the treatment of the poisonous effects of Carbolic Acid. Also apomorphia, by the mouth $\frac{1}{5}$ of a grain, by sub-cutaneous injection of $\frac{1}{10}$ of a grain.

ACID. HYDROCHLORICUM.—See Acid. Sulphuricum.

ACID. HYDROCYANICUM.—Prussic Acid.

Forms.—Dilute Hydrocyanic Acid—cyanide of potassium—essential oil of almonds—bitter almond water—laurel water.

Symptoms. — Spasmodic breathing, convulsions, insensibility, dilated pupils, fixed and glistening eyes, spasmodic closure of jaws, almost imperceptible pulse, and speedy death.

Antidotes.—1. Ammonia and its carbonates. 2. Mixed oxides of iron. 3. Chlorine. Fresh air, with or without ammonia, artificial respiration, vigorous cold affusion showered upon head and neck.

Form of Exhibition.—1. Carbonate of ammonia with water to be swallowed; diluted ammonia to the nostrils, and vapour of ammonia (smelling salts).

2. The mixed oxides of iron—prepared by dissolving ten grains of sulphate of iron in one ounce of water, and adding one drachm of tincture of muriate of iron; to this solution add one scruple of carbonate of potash, previously dissolved in one or two ounces of water—administer the mixture immediately.

3. Chlorine. A few drops of a solution of chlorine or of nitro-muriatic acid mixed with water, may be introduced into the stomach.

ACID. MURIATICUM.
ACID. NITRICUM.
ACID. NITRO—MURIATICUM. } See Acid. Sulphuricum.

ACID. OXALICUM, and its compounds (salt of lemon, salt of sorrel).

Symptoms.—Burning pain in throat, œsophagus and stomach, vomiting of mucus and blood, altered to a dark green or black hue.

Antidotes.—1. Chalk. 2. Magnesia. Emetics and stomach pump.

Form of Exhibition.—1. Chalk (or whitening) suspended in milk or water.

2. Magnesia suspended in milk or water.

ACID. SULPHURICUM.

Symptoms.—Immediate burning pain in mouth, œsophagus and stomach, vomiting of liquid with mucus, corrosion of parts touched by the poison. Death from inflammation or from asphyxia, the chink of the glottis becoming occluded by œdema.

Antidotes.—1. Alkalies. 2. Fixed oils and fatty matter, Demulcent drinks.

Form of Exhibition.—1. Magnesia with milk, chalk (or whitening) with milk, soap-suds, dilute solution of of soda or potash.

2. Almond, olive, or lamp oil, &c.

3. Linseed tea, solution of starch, gum or gelatine, &c.

√ **ACONITE.**

Forms. — Aconitina — Liniment—Root—Tincture.

Symptoms.—Numbness and tingling in the mouth and throat, vomiting purging, giddiness, dilated pupil, feeble pulse, oppressed breathing, muscular paralysis. Death either from syncope or apnœa.

Antidotes.—1. Tannic Acid. 2. Animal Charcoal. 3. Atropine, Belladonna.

Also emetic of sulphate of zinc; internal and external stimulants.

Form of Exhibition.—1. For Tannic Acid, see Antimony.

2. For Animal Charcoal, see Acidum Arseniosum.

3. Subcutaneous injection of Solution of Atropine; also Tincture, Succus, and Extract of Belladonna, with water.

ALKALIES.

Forms.—Ammonia, Lime, Potash, Soda.

Symptoms.—Burning pain along alimentary tract, corrosion of tissues, vomiting of mucus and blood, diarrhœa.

Antidotes.—1. Acetic Acid. 2. Citric Acid, Tartaric Acid. 3. Oil.

Form of Exhibition.—1. Vinegar and water (p. œ), water acidulated with acetic or pyroligneous acid, sour beer.

2. Aqueous solution of citric or

tartaric acid, lemon, orange, or lime juice.

3. Almond, olive, or lamp oil.

Note.—The antidote for caustic lime is carbonic acid in the form of bottled soda water.

AMMONIA—See Alkalies.

ANTIMONY.

Forms.—Tartar Emetic — Sesquichloride, or butter of antimony.

Symptoms.— Burning pain in stomach and bowels, vomiting, purging, thirst, cold perspiration, cramps, great debility, and death.

Antidotes.—1. Tannic Acid. 2. Alkalies.

Form of Exhibition.—1. Solution of tannic acid, astringent decoctions (as of tea, nut-galls, cinchona, oak-bark, pomegranate, tormentilla or uva ursi); astringent tinctures (as of cinchona, catechu or kino) diluted with water; astringent extracts dissolved in water. 2. See Acidum Sulphuricum.

ARSENIC—See Acidum Arseniosum.

BARYTIC SALTS.

Forms.—Chloride of Barium (muriate of Baryta)—Nitrate of Baryta—Carbonate of Baryta.

Symptoms.—Vomiting, purging with griping, contracted pulse, staggering, convulsions, paralysis, insensibility, and death. Its action is analogous to arsenic, acting less energetically on the stomach, but more rapidly on the nervous system, and causing death in a shorter time.

Antidotes.—Alkaline or earthy sulphates.

Form of Exhibition. — Solution of sulphate of magnesia, or of sulphate of soda (Glauber Salts), or of alum. For Carbonate of Baryta, a mixture of sulphate of magnesia and vinegar diluted.

BELLADONNA.

Forms.—Liniment—Tincture— Succus—Atropia.

Symptoms.—Dryness of mouth and throat, insatiable thirst, sickness, vomiting, greatly dilated pupil, giddiness, palpitation, coma, death.

Antidotes.—1. Opium. 2. Tannic Acid. 3. Animal charcoal. 4. Physostigmatis Venenosum (Calabar Bean).

Form of Exhibition.—1. Tincture or wine diluted with water, and administered either by mouth or as enema, &c.; or by the subcutaneous injection of solution of morphia.

2. For Tannic Acid, see Antimony.

3. Purified animal charcoal, common animal charcoal, ivory black.

4. Extract ⅛ gr. every hour. Tincture subcutaneously, ⅓ gr. in 10 min. water.

CANNABIS INDICA.

Symptoms.—The incautious use of

Indian Hemp, causes a form of temporary insanity, which is at once "recognised by the strange gait of the patient, a constant rubbing of the hands, perpetual giggling, and a propensity to caress and chafe the feet of all by-standers, of whatever rank. The eye wears a characteristic expression of cunning and merriment. In a few cases the patients are violent; in many, highly aphrodisiac; in all, voraciously hungry."

Antidotes.—Hot brandy and water; lemon juice, vinegar, and the like. Blister to nape of neck; sleep.

CANTHARIDES.

Form.— Powder — Acetum — Liniment—Tincture.

Symptoms. — Burning pain in stomach, vomiting, purging, pains in loins, bloody urine, strangury, priapism, delirium, convulsions, death.

Antidotes, &c. — Emetics. Mucilaginous drinks. Opium, tincture or wine diluted, by the mouth, and by enema. Blood letting, if necessary.

CHLORAL HYDRATE.

Symptoms. — Excitement with delirium, cramp in legs, flushed face, closed eyes, followed by profound unconsciousness; stertorous breathing, gradually becoming more and more feeble; lividity and pulselessness.

Antidotes.—Strychnia, according to

the experiments of Liebreich, acts as a speedy and complete antidote. When Chloral Hydrate has been administered in such quantity as to act rapidly on the respiratory centres, and the pupils are contracted, nitrite of amyl is indicated as the antidote; but when the drug has acted slowly as a culminative poison, the heart fails and the pupils are dilated, then strychnia should be given. Picrotine, $\frac{1}{20}$ gr., enough for 30 grs. of chloral. Coffee, &c.

CHLOROFORMUM.

Forms.—Vapor—Spirit—Liniment.

Symptoms.—Insensibility, noisy, stertorous, quick, shallow breathing; quick, weak pulse; relaxation of muscles, dilatation of pupils, surface cold, the pulse less and less frequent until the action of the heart ceases. (See also page 161).

Antidotes, &c.—Currents of fresh air, artificial respiration (see page 230), stimulants, cold water dashed over the face and chest; galvanism, one pole applied to the nape of the neck, and the other to the pit of the stomach, to stimulate the diaphragm to action.

Hypodermic injection of 1 drachm of ether. Nitrite of Amyl—(see pages 119 and 162).

CONIUM.

Form.—Fruit—Succus — Tincture—Liniment.

Symptoms.—Dryness of throat, delirium, coma, convulsions, death from paralysis of respiratory muscles.

Antidotes.—1. Tannic Acid. 2. Animal charcoal. Also emetics, internal and external stimulants.

Form of Exhibition.—1. For Tannic Acid, see Antimony.

2. Purified or common animal charcoal, ivory black.

COPPER.

Forms. — Sulphate — Sub-Acetate (Verdigris).

Symptoms.—A coppery taste, eructations, violent vomiting and purging, griping pains, cramps in the legs and thighs, headache, giddiness, convulsions and insensibility; sometimes death ensues without any marks of local irritation, the symptoms being those indicative of a disordered condition of the nervous system.

Antidote.—Albumen.

Form of Exhibition.—See Mercury.

CROTON.

Forms.—Liniment—Oil—Seeds.

Symptoms.—Burning pain along alimentary tract, severe purging, inflammation of bowels.

Antidotes.—Emetic (if seen early); demulcent drinks; mucilage; olive oil; opium.

DIGITALIS.

Forms.—Powder — Succus (juice) — Tincture.

Symptoms.—Vomiting, purging, slow and irregular pulse, dilated pupils, great debility, stupor, convulsions, coma, death.

Antidotes.—1. Tannic Acid. 2. Animal charcoal. Also emetics of sulphate of zinc; internal and external stimulants, and particularly the recumbent posture.

Form of Exhibition.—1. For Tannic Acid, see Antimony.

2. Animal charcoal, purified or common, ivory black.

HYOSCYAMUS.

Form. — Powder — Succus (juice) Tincture.

Symptoms.—Giddiness, delirium, dilated pupil, fulness about head, drowsiness, cold sweats, paralysis, exhaustion, death.

Antidotes. — Coffee;—Also emetics, stomach-pump, stimulants, lemon juice.

IODINE.

Forms.— Solid Iodine — Tincture— Liniment.

Symptoms.—The symptoms of an *extreme* case of Iodism are violent vomiting and purging, with fever, great thirst, palpitation, rapid and extreme emaciation, cramps, small and frequent pulse, occasionally with dry cough, and terminating in death. This condition is of very rare occurrence, and may be referred to other causes—perhaps gastroenteritis. In large doses, it is an irritant poison; the symptoms being restlessness, burning heat, palpitation, very frequent pulse, violent priapism, copious diarrhœa, excessive thirst, trembling, emaciation, and occasional syncope.

Antidotes.—Starch in solution. Albumen; milk.

Form of Exhibition.—Decoction of starch (wheat-starch, arrowroot, or tapioca), flour and water, boiled potatoes, bread.

LEAD.

Forms.—Oxides—Carbonates—Acetate (Sugar of Lead)—Diacetate (Goulard's Extract), Nitrate, Lead paint.

Symptoms. — Dryness and constriction of throat, pain in stomach and bowels, colic, paralysis of extensor muscles, apoplectic symptoms.

Antidotes. — 1. Alkaline or earthy sulphates. 2. Hydrosulphurets. 3. Iodide of potassium.

Form of Exhibition.—1. See Barytic salts (for carbonate of Lead, a mixture of sulphate of magnesia and vinegar diluted—A. T. Taylor).

2. A solution of sulphuretted hydrogen or Harrogate water, to be drunk.

Painters, workmen in lead factories and others, whose skin is impregnated with lead, should employ a sulphuretted bath, made by adding four ounces of sulphuret of potassium to thirty gallons of water.

3. Iodide of potassium in water.

MERCURY.

Forms.—Perchloride of mercury (Corrosive Sublimite)—Nitrate of Mercury, &c.

Symptoms.—Burning heat and pain in mouth and throat immediately after partaking of it. Pain soon extending to abdomen. Sickness, vomiting, matter thrown up mixed with mucus and blood. Diarrhœa, dysentery, cramps, convulsions, insensibility, death.

Antidotes.—1. Albumen. 2. Iron and zinc. 3. Milk. 4. Iodide of potassium.

Form of Exhibition.—1. Raw eggs diffused in water; milk; wheat flour mixed with water.

2. A mixture of two parts of finely divided iron (filings) and one part of zinc (Bouchardat.)

MORPHIA—See Opium.

NUX VOMICA—see Strychnia.

OPIUM.

Forms. — Black drops — Extract of Opium—Liniment of Opium—Liquor Opii sedativus (Battley's sedative)—Dover's powder—Morphia—Paregoric

— Syrup of Poppies — Tincture of Opium—Wine of Opium.

Symptoms. — Drowsiness, giddiness, stupor, insensibility, stertorous breathing, contracted pupil, feeble pulse, coma, convulsions, death.

Antidotes.—1. Tannic Acid. 2. Animal Charcoal. 3. Atropine. Also emetics, stomach pump, external stimulants, artificial respiration, enforced exertion.

Form of Exhibition.—1. Solution of tannic acid, astringent decoctions, (as of tea, nut-galls, cinchona, oak-bark, pomegranate, tormentilla.) Astringent tinctures (as of cinchona, catechu, or kino) diluted with water. Astringent extracts dissolved in water.

2. Animal charcoal—purified animal charcoal, common animal charcoal, ivory black.

3. Atropine—(see page 216.)

OXALIC ACID—see Acid. Oxalicum.

POTASH—see Alkalies.

SILVER.

Forms.—Nitrate (Lunar Caustic).

Symptoms.—Corrosion of the tissues touched by it; sometimes causing nausea and vomiting, also convulsions and paralysis.

Antidotes. — 1. Chloride of sodium (common salt). 2. Albumen.

Form of Exhibition. — 1. Common salt dissolved in water.; sea water.

2. Albumen—see Mercury.

SODA—see Alkalies.

STRYCHNIA.

Forms.—Nux Vomica—Strychnia—solution of Strychnia.

Symptoms.—Twitching of muscles, jerking of limbs, tetanic spasms, dyspnœa, death.

Antidotes.—Chloral, chloroform, tincture of aconite, tincture of belladonna. A little of either of these tinctures should be given, and the patient afterwards put under chloroform (Milne). Infusion of tobacco. Extract of conium.

SULPHURETTED HYDROGEN.

Forms.—Gas (from sewers, drains, &c.)—Hydrosulphuret of Ammonia (Sulphuret of Ammonium)—Sulphuret of Potassium.

Symptoms.—Giddiness, nausea, drowsiness, convulsions, insensibility, with depression of all the powers of life, death.

Antidotes.—1. Chlorine. 2. Hypochlorite of soda and hypochlorite of lime. Fresh air and stimulants.

Form of Exhibition.—1. Chlorine mixed with air.

2. The Hypochlorite of soda and lime dissolved in water.

TARTAR EMETIC—see Antimony.

TIN.

Form.—Chloride (Spirit of Tin).

Symptoms.—Convulsive movements of the muscles of the extremities and the face, and sometimes paralysis.

Antidotes.—1. Albumen. 2. Alkalines.

Form of Exhibition.—1. See Mercury. 2. See Acid. Sulphuricum.

ZINC.

Forms.—Sulphate—Acetate—Chloride.

Symptoms.—A burning sensation in the stomach, nausea, vomiting, anxiety, short breathing, small quick pulse, cold sweats, fainting, convulsions, death.

Antidotes.—1. Albumen. 2. Alkalies.

Form of Exhibition.—1. See Mercury. 2. See Acid. Sulphuricum.

DENTAL
PHARMACOPŒIA.

The initials following the names of the preparations indicate the source of the respective formulæ, as :—

A.	Alvin.
B.	Boulton.
B. P.	British Pharmacopœia.
B. P. F.	Beasley's Pocket Formulary.
C.	Oakley Coles.
C. H.	Chest Hospital.
C. P.	Carlo Parvesi.
D. H. L.	Dental Hospital of London Pharmacopœia.
E.	Ehrle, Dr.
F.	Fairthorne.
G.	Gregory, Dr., Stroud.
H.	Hollander.
J. S.	James Stocken.
K. & W.	Kempton & Williams.
M.	Martindale.
N.	Neargaard.
O.	M. Ottinger.
P.	Parrish.
Pr.	Proctor.
R.	Richardson, Dr.
Rr.	Ringer, Dr.
R. F. H.	Ryan's, Dr., Formulary of Hospitals.
S.	Sawyer, Dr.
S. C. P.	Squire's Companion to British Pharmacopœia.
S. S. W.	White's Materia Medica.
T. H.	Throat Hospital Pharmacopœia.
T.	Thorogood.
W.	Waring, Dr.
Y. B. P.	Year Book of Pharmacy.

DENTAL
PHARMACOPŒIA.

Acidum Hydrochloricum Dilutum.

(B. P.)

℞

Acidi Hydrochlorici	f℥viij

Distilled Water sufficient to make the mixture, when cooled to 60° F. measure 26½ fluid ounces.

Acidum Nitricum Dilutum.

(B. P.)

℞

Acidi Nitrici	f℥vj

Distilled Water sufficient to make the mixture, when cooled to 60° F, measure 31 fluid ounces.

Acidum Sulphuricum Aromaticum.

(B. P.)

℞

Acidi Sulphurici or 2419 grs. by weight	f℥iij
Spiritûs Rectificati	Oij
Pulveris Cinnamomi	℥ij
Pulveris Zingiberis	ʒx

Mix the Acid gradually with the Spirit, add the Powders, and macerate for seven days agitating frequently, then filter. Sp. gr. 0·927.

Acidum Sulphuricum Aromaticus cum Acido Tannico.

Tannic Acid added to Aromatic Sulphuric Acid to saturation.

A powerful Styptic.

Acidum Sulphuricum Dilutum.

(B. P.)

℞

Acidi Sulphurici	f℥vij

Mix gradually Distilled Water, q. s., to measure, when cooled to 60° F., 83½ fluid ounces.

Ammoniæ Liquor.

(B. P.)

Preparation.—Mix one part of the stronger solution of Ammonia with two parts of distilled water. Sp. gr. 0·959. One fluid drachm contains 5·2 grains of Ammonia or 10 per cent. Preserve in a stoppered bottle.

Calx Sacharata.

℞

Sacchari	16 parts
Aquæ Destillatæ	40 parts
Calcis Hydratis	5 parts

Dissolve the sugar in the water then add the lime, filter, and evaporate at 100° F.

Chloral Camphorata.

℞

Chloralis Hydratis	3 parts
Camphoræ	1 part

Misce.

An external application in Neuralgia.

Chloramyl.

℞

Chloroformi	℥xii
Amyli Nitritis	ʒii

Misce.

Similar to Chloroform and Ether but vapour less pungent.

Collodium cum Cantharide.

(O.)

℞

Collodii	p. æq.
Ætheris Cantharidis (Cantharides 1 part, Ether 2 parts, digest 3 days and express)	p. æq.

Misce.

Counter-irritant and Vesicant. For children, one part of former to two of latter. In periodontitis, applied to the gum about the root of tooth affected; the gum having been previously carefully dried.

Collodium Flexile.

(B. P.)

℞

Collodii	℥vi
Balsami Canadensis	gr. 120
Olei Ricini	ʒi

Misce.

To be kept in well stoppered bottles.

Preferable to simple collodion, not being so liable to crack.

Collodium Flexile Stypticum.

℞

Collodii	ʒiii
Tincturæ Ferri Perchloridi	ʒi
Olei Ricini	gtt ii.

Misce.

Styptic.

Collodium Stypticum.

(C. P.)

℞

Collodii	100 parts
Acidi Carbolici	10 parts
Acidi Tannici Puri	5 parts
Acidi Benzoici	5 parts

Agitate till the mixture is complete. It adheres strongly to the tissues, and effects the instantaneous coagulation of the blood and albumen. The tannin effects a consistent coagulation of the blood, whilst benzoic acid has a cicatrising action on the tissues.

Collodium Stypticum.

(R.)

To a saturated solution of Tannic Acid in Alcohol and Ether (equal parts), as much pyroxylin (gun-cotton) is added as the liquid will dissolve. Styptic to cuts, &c.

Colouring for Tooth Powder.

(F.)

Carmini Opt.	℥i
Liq. Ammoniæ Fortiss.	℥vi

Mix. Add this solution to sufficient precipitated chalk to absorb it, triturate with more chalk until a powder is obtained; this is allowed to dry and free itself from the free ammonia. This quantity is sufficient to colour 13℔s of tooth powder.

By this method of treating the carmine its colouring power is nearly doubled.

Cotton Absorbent.

Cotton may be prepared by boiling the cotton with a 5 per cent. solution of caustic potash or soda for about half an hour; then wash and immerse in 5 per cent. solution of Chlorinated Lime for a quarter of an hour. The cotton is again washed then dipped in water acidulated with HCl. and afterwards boiled in a 5 per cent. solution of the alkali; again washed and dipped in acidulated water, and finally washed thoroughly with pure water.

Cotton Styptic.

(E.)

Prepared by boiling the finest carded cotton for half-an-hour or an hour in a solution containing 4 per cent. of caustic soda, then thoroughly washing it out in cold spring water, wringing and drying it. The cotton is thus effectually purified, and is capable of imbibing fluids uniformly. It is then to be dipped two or three times in fluid chloride of iron diluted with one third of water, expressed and dried in a current of air, but not in the sun, or by the aid of a high temperature ; finally it is carded out.

It is of a beautiful yellowish brown colour, feeling like ordinary dry cotton. As it is highly hygroscopic, it must be kept dry, and for transportation packed in caoutchouc or bladder.

When the cotton is applied to a bleeding wound, it induces contraction of the tissue and coagulation of the blood, and thus arrests the hæmorrhage. The coagulating power of the chloride of iron is increased by the extension of its surface. The application of the prepared cotton is not particularly painful, whilst, by sucking up the superfluous discharge and preventing its decomposition, it seems to operate favourably on the progress of the wound.

Dentifricium Antisepticum.

(J. S.)

℞

Acidi Carbolici	m. xxx
Pulveris Ossis Sepiæ	ʒii
Pulveris Radicis Iridis	ʒi
Cretæ Præcipitatæ	℥iii
Olei Caryophylli	gtt. iii

Misce.

Dentifricium Astringens.

(J. S.)

℞

Sodæ Carbonatis Exsicatæ	gr. xx
Cretæ Præcipitatæ	℥ii
Pulveris Ossis Sepiæ	ʒii
Acidi Tannici	gr. xxx
Olei Caryophylli	gtt. iii

Misce.

Dentifricium Ordinarius.

(J. S.)

℞

Cretæ Præcipitatæ	℥xi
Magnesiæ Calcinatæ	℥ii
Pulveris Saponis Albi	ʒiv
Pulveris Cinchonæ Flavæ	ʒiv
Pulveris Ossis Sepiæ	℥i
Pulveris Aluminis Usti	ʒii
Otto Rosæ	min. viii
Olei Caryophylli	min. vi

Misce.

Dentifricium Quinæ.

(J. S.)

℞

Quinæ Disulphatis ....gr. iv
Pulveris Ossis Sepiæ............ ʒiv
Cretæ Præcipitatæ............... ℥iv
Otto Rosæ .... gtt. iv

Misce.

Dentifricium Saponis.

(J. S.)

℞

Cretæ Præcipitatæ .... ℥iv
Pulveris Saponis Albi ...... ʒii
Pulveris Ossis Sepiæ .... ʒiv
Otto Rosæ.....................gtt. iv

Misce.

Mialhe's Dentifrice.

Alcohol, 1000 parts; kino, 100 parts; rhatany root, 100 parts; tincture of tolu, 2 parts; tincture of benzoin, 2 parts; oil of cannella, 2 parts; oil of peppermint, 2 parts; oil of aniseed, 1 part.

The kino and the rhatany are to be macerated in the alcohol for seven or eight days, and after filtration the other articles are to be added. A teaspoonful of this preparation should be used to rinse the mouth after the use of the tooth-powder.

Astringent for excessive relaxation and sponginess of the gums.

Mialhe's Tooth Powder.

Sugar of milk, 1000 parts; lake, 10 parts; pure tannin, 5 parts; oil of mint, oil of aniseed and oil of orange-flowers so much as to impart an agreeable flavour to the composition.

Mialhe's directions for the preparation of this tooth powder are to rub well the lake with the tannin, and gradually add the sugar of milk, previously powdered and sifted, and lastly the essential oils are to be carefully mixed with the powdered substances.

Gargarismata.

The term "*gargle*" has been applied to all washes for the mouth, as well as to those for the throat; such being a better term than that of lotion, which is generally understood to be an external remedy.

Gargarisma Acidi Carbolici.

(T. H.)

℞

Acidi Carbolici	m xx
Glycerini	ʒiv
Aquæ	ad ℥x

Misce.

Stimulant and Antiseptic.

Gargarisma Acidi Carbolici Fort.

(J. S.

℞

Acidi Carbolici	ʒi
Glycerini	ʒiv
Aquæ	ad ℥x.

Misce.

Stimulant and Antiseptic.

Gargarisma Acidi Carbolici c Iodo.

(B.)

℞

Tincturæ Iodi Compositæ	m xlv
Acidi Carbolici	m vi
Glycerini	℥i
Aquæ Destillatæ	ad ℥v

Misce.

Stimulant and Antiseptic.

Gargarisma Acidi Gallici c Chloro.

℞

Acidi Gallici	gr. xl
Liquoris Sodæ Chlorinatæ	ʒii
Glycerini	ʒii
Aquæ Destillatæ	ad ℥viii

Misce.

In Tonsilitis, &c.

Astringent and Antiseptic.

Gargarisma Acidi Hydrochlorici.

(T. H.)

℞

Acidi Hydrochlorici Diluti	ʒii
Glycerini	ʒiv
Aquæ Destillatæ ad	℥x

Misce.

Stimulant.

Gargarisma Acidi Salicylici.

(M.)

℞

Acidi Salicylici	ʒii
Spiritus Vini Rectificati	ʒx

Misce.

One fluid drachm of this solution to half a pint of tepid water—in other words about 1 in 500—makes an agreeable non-irritating and efficient gargle.

Gargarisma Acidi Salicylici cum Sodæ Biborate.

(M.)

℞

Acidi Salicylici	ʒii
Sodæ Biboratis	ʒiii
Glycerini	℥iiss
Aquæ Destillatæ	℥iii

Misce.

Emolient, alkaline, and antiseptic. One or two drachms to half a pint of water at 95° F.

Gargarisma Acidi Tannici.

(T. H.)

℞

Acidi Tannici	50 ad. 200 gr.
Spiritûs Rectificati	ʒi
Aquæ Destillatæ	ad ℥x

Misce.

Astringent.

Gargarisma Acidi Tannici et Pyrethri.

(D. H. L.)

℞

Acidi Tannici	gr. xx
Tincturæ Pyrethri	ʒiii
Aquæ Rosæ	ad ℥vj

Misce.

Astringent.

Gargarisma Aluminis.

(T. H.)

℞

Pulveris Aluminis	gr. lxxx
Aquæ Destillatæ	℥x

Misce.

Mild Astringent.

Gargarisma Aluminis cum Acido Tannico.

(T. H.)

℞

Pulveris Aluminis	gr. lx
Acidi Tannici	gr. lxxx
Aquæ Destillatæ	ad ℥x

Misce.

Astringent.

Gargarisma Aluminis et Potassæ Chloratis.

(J. S.)

℞

Pulveris Aluminis	ʒii
Potassæ Chloratis..................	ʒii
Aquæ Destillatæ	ad ℥x

Imp
[illegible]

Misce.

Refrigerant and Astringent.

Gargarisma Arnicæ.

℞

Tincturæ Arnicæ	ʒii
Glycerini	ʒii
Aquæ Rosæ	℥ii
Aquæ Destillatæ	ad ℥x

Misce.

Stimulant.

Gargarisma Boracis.

(S. S. W.)

℞

Sodæ Biboratis	gr. xl
Glycerini	℥i
Aquæ Destillatæ	ad ℥iv

Misce.

Mild Alkaline Astringent. In inveterate cracked tongue.

Gargarisma Boracis cum Myrrhâ.

(T. H.)

℞

Sodæ Biboratis	ʒiv
Glycerini	
Tincturæ Myrrhæ	aā ℥ss
Aquæ Destillatæ	ad ℥x

Misce.

Alkaline Astringent.

Gargarisma Calcis Chloratæ.

(D. H. L.)

℞

Liquoris Calcis Chloratæ	ʒii
Aquæ	ad Oj

Misce.

Antiseptic.

Gargarisma Calendulæ.

℞

Tincturæ Calendulæ	ʒiv
Aquæ Destillatæ	ad ℥x

Misce.

Discutient.

Gargarisma Chlori.

(J. S.)

℞

Liquoris Chlori	ʒiv
Mellis	ʒiv
Aquæ Destillatæ ....ad	℥x

Misce.

Antiseptic.

Gargarisma Hydrargyri Perchloridi.

(T. H.)

℞

Liquoris Hydrargyri Perchloridi	℥v
Glycerini	ʒiv
Aquæ Destillatæ ....ad	℥x

Misce.

Stimulant. Used in ulcerous and cachetic affections of the throat and mouth.

Gargarisma Krameriæ.

(T. H.)

℞

Infuse one hour and strain.

Mild Astringent.

Gargarisma Potassæ Chloratis.

(T. H.)

℞

Potassæ Chloratis	ʒiv
Aquæ Destillatæ	℥x

Misce.

Antiseptic. In aphthous and secondary syphilitic affections of the mouth, fauces and tongue; also in cases of salivation.

Gargarisma Potassæ Chloratis cum Arnicâ.

(J. S.)

℞

Potassæ Chloratis	ʒii
Sodæ Biboracis	ʒi
Potassæ Nitratis	ʒss
Tincturæ Arnicæ	ʒii
Aquæ Rosæ	ad ℥vii

Misce.

Astringent and Antiseptic. In gingivitis and general irritation of the mouth.

Gargarisma Potassæ Chloratis et Boracis.

(J. S.)

℞

Potassæ Chloratis	ʒii
Sodæ Biboratis	ʒi
Potassæ Nitratis	ʒss
Aquæ Destillatæ	℥viii

Misce.

Antiseptic and Refrigerant.

Gargarisma Potassæ Permanganatis.

(T. H.)

℞

Liquoris Potassæ Permanganatis	ʒi
Aquæ Destillatæ	℥x

Misce.

Antiseptic.

Gargarisma Potassii Bromidi.

(T. H.)

℞

Potassii Bromidi	gr. 100
Aquæ Destillatæ	℥x

Misce.

Sedative.

Gargarisma Sodæ Chloratæ.

(J. S.)

℞

Liquoris Sodæ Chloratæ	℥ss
Mellis	℥ss
Aquæ Destillatæ	ad ℥x

Misce.

Antiseptic. Used in mercurial ptyalism.

Gargarisma Sodæ Chloratæ.

(D. H. L.)

℞

Liquoris Sodæ Chloratæ	ʒii
Aquæ	Oj

Misce.

Antiseptic.

Gargarisma Sodæ Hyposulphitis.

(J. S.)

℞

Sodæ Hyposulphitis	ʒii
Syrupi Aurantii	ʒiv
Aquæ Destillatæ	ad ℥iv

Misce.

Stimulant and Antiseptic. In parasitic formations, aphthous ulcers, &c., and diphtheritic conditions.

Gargarisma Thymolis.

(S.)

℞

Thymolis	gr. v
Glycerini	ʒiv
Spiritûs Vini Rectificati	ʒii
Aquæ Destillatæ	ad ℥xii

Misce.

Antiseptic.

Gargarisma Zinci Chloridi.

℞

Zinci Chloridi	gr. i ad v
Mellis	ʒi
Aquæ Destillatæ	ad ℥i

Misce.

Disinfectant.

Gargarisma Zinci Sulphatis.

(D. H. L.)

℞

Zinci Sulphatis	ʒss
Morphiæ Acetatis	gr. i
Decocti Quercus, vel Infusi Rosæ	
Aquæ Destillatæ	āā. ℥ii

Misce.

Astringent.

Glycerinum Acidi Carbolici.

(B. P.)

℞

Acidi Carbolici	℥i
Glycerini	℥iv

Misce.

Mild Escharotic.

Glycerinum Acidi Tannici.

(B. P.)

℞

Acidi Tannici	ʒiv
Glycerini	℥ii

Misce.

Powerful Astringent.

Glycerinum Boracis.

(B. P.)

℞

Sodæ Biboratis	℥i
Glycerini	℥vi

Solve.

Mild Alkaline Astringent.

Glycerinum Potassæ Chloratis.

(S. S. W.)

℞

Potassæ Chloratis	℥i
Glycerini	℥x

Solve.

Antiseptic. In ill-conditioned ulcers and wounds.

Glycerinum Sodæ Sulphitis.

(S. S. W.)

℞

Sodæ Sulphitis	ʒi
Glycerini	℥i

Solve.

In aphthous ulcers.

Guttæ Acidi Tannici.

(J. S.)

℞

Acidi Tannici	ʒii
Tincturæ Arnicæ	ʒii
Tincturæ Myrrhæ	ad ℥i

Misce.

Astringent. Useful application to softened and sensitive dentine, also ulcers and abrasions arising from artificial dentures.

Guttæ Ætheris et Acidi Tannici.

(D. H. L.)

℞

Acidi Tannici	ʒii
Ætheris	℥j

Misce.

Anodyne and Astringent. To be applied on cotton to the exposed dental pulp.

Guttæ Anodynæ.

(J. S.)

℞

Morphiæ Acetatis	gr. 120
Acidi Tannici	gr. 160
Gummi Mastichi	℥i
Spiritûs Rectificati	℥iv

Misce., s. a.

Anodyne. Applied on cotton to a carious tooth.

Guttæ Camphoræ et Chloroformi.

℞

Camphoræ	℥i
Chloroformi	q.s.

Solve.

Sedative. Applied on cotton to a carious tooth.

Guttæ Camphoræ et Saponis.

℞

Spiritûs Rosmarini	℥i
Camphoræ	ʒi
Saponis Albi	ʒiv

Misce.

Stimulant and Alkaline. A few drops on wet tooth brush.

Guttæ Creasoti et Camphoræ.

(s. s. w.)

℞

Camphoræ	gr. xx
Creasoti	℥i

Solve.

Anodyne. Applied on cotton to a carious tooth.

Guttæ Creasoti et Iodi.

(s. s. w.)

℞

Linimenti Iodi
Creasoti (vel Acidi Carbolici)
partes æquales

Misce.

Stimulant and Antiseptic. Changing the pus-producing to a plasma-producing surface.

Guttæ Creasoti et Morphiæ.

(J. S.)

℞

Morphiæ Acetatis	gr. xx.
Creasoti (vel Acidi Carbolici)	ʒii

Solve.

Sedative in odontalgia. Applied on cotton and sealed.

Guttæ Cupri Sulphatis.

(D. H. L.)

℞

Cupri Sulphatis	gr. xx
Oxymellis	℥j

Misce.

Antiseptic and Astringent. To be applied with a camel hair pencil.

Guttæ Eucalypti et Iodoformi.

℞

Iodoformi	gr. xv
Olei Eucalypti	ʒi

Misce.

Antiseptic. As a dressing to root canals and suppurating pulps.

Guttæ Hæmostaticæ.

℞

Ferri Perchloridi	℥ss
Collodii	℥iii

Solve.

Astringent.

Guttæ Odontalgiæ.

1

(Y. B. P.)

℞

Chloroformi
Liquidi Opii (Sydenham) ...āā ʒij
Tincturæ Benzoini .... ℥j

Misce.

Anodyne. Applied on cotton to a carious tooth.

2

(Y. B. P.)

℞

Creasoti
Chloroformi ....āā ʒij
Liquidi Opii (Sydenham) ...... ʒiv
Tincturæ Benzoini .... ℥j

Misce.

Anodyne. Applied on cotton to a carious tooth.

3

(Y. B. P.)

℞

Chloralis
Camphoræ........................āā ʒj
Morphiæ Acetatis............ grs. ij
Olei Menthæ Piperitæ .... ʒij

Misce.

Anodyne. Applied on cotton to a carious tooth.

4

℞

Chloroformi
Creasoti, (vel Acidi Carbolici)
Liquidi Opii (Sydenham)
Vel Morphiæ Hydrochloratis āā ʒii
Tincturæ Benzoini .... ℥j

Misce.

Applied on cotton to a carious tooth.

5

℞

Aluminis .... ʒj
Spiritûs Ætheris Nitrosi......... q.s.

Solve.

Astringent.

6

℞

Acidi Tannici .... ʒi
Etheris Sulphurici .... ʒii

Solve.

Astringent and Sedative.

7

℞

Sodæ Carbonatis................. ʒi
Solutionæ Morphiæ Acetatis... q.s.

Solve.

Antacid and Anodyne.

Guttæ Thymolis.

(A.)

℞

Thymolis (crystal)	1 part.
Glycerini	100 part.

Misce.

Astringent. Useful in superficial stomatitis and erosion of the mucous membrane.

Guttæ Thymolis Fortis.

(A.)

℞

Thymolis (crystal)	1 part.
Glycerini	2 ad 4 part.

Misce.

Caustic. A substitute for carbolic acid, &c.

Guttæ Thymolis cum Iodo.

(A.)

℞

Thymolis (crystal)	1 part.
Iodi	1 part.
Potassii Iodidi	1 part.
Glycerini	5 ad 15 part.

Misce.

Mild caustic. A substitute for carbolic acid, more agreeable and better tolerated.

Haustus Aloës.

(D. H. L.)

℞

Decocti Aloës Compositi
Misturæ Camphoræ ....āā ʒvj

Misce.

Laxative.

Haustus Aperiens.

(D. H. L.)

℞

Infusi Sennæ Compositi......... ʒxi
Magnesiæ Sulphatis .... ʒii
Olei Menthæ Piperitæ ......m. iv

Misce.

Mild Aperient.

Haustus Rhœi.

(J. S.)

℞

Confectionis Aromaticæ
Pulveris Rhei...............aa gs xx
Potassæ Tartratis .... ʒii
Tincturæ Cardamomi Comp.. ʒi
Aquæ Menthæ Piperitæ.....ad ℥iss

Misce.

Stomachic Aperient.

Infusum Krameriæ.

(B. P.)

℞

Radicis Krameriæ Contusæ...	℥ss
Aquæ Destillatæ Ferventis ...	f℥x

Infuse in a covered vessel, for one hour, and strain.

Dose, 1 to 2 fluid ounces.

Astringent.

Infusum Maticæ.

(B. P.)

℞

Foliorum Maticæ	℥ss
Aquæ Destillatæ Ferventis ...	f℥x

Infuse in a covered vessel for an hour, and strain.

Dose, 1 to 4 fluid ounces.

Astringent.

Linimentum Aconiti.

(B. P.)

℞

Radicis Aconiti (in coarse powder)	℥xx
Camphoræ	℥j
Spiritûs Rectificati	q. s.

Moisten the Aconite with some of the Spirit, and macerate in a closed vessel for 3 days; then percolate slowly into a receiver containing the Camphor, until the product measures 1 pint.

Acute Neuralgia. To be applied with a camel-hair pencil, alone or with soap liniment.

Linimentum Anodynum.

(K. & W.)

℞

Linimenti Aconiti
Linimenti Belladonnæ ......aa ʒvii
Chloroformi........................ ʒii

Misce.

Anodyne in acute neuralgia. Saturate a piece of lint with this Liniment and apply to the part affected, cover it with a piece of spongio-piline previously soaked in hot water.

Linimentum Belladonnæ.

(B. P.)

℞

Radicis Belladonnæ (in coarse
    Powder) .... ℥xx
Camphoræ .... ℥j
Spiritûs Rectificati............... q.s.

Prepared in the same manner as *Linimentum Aconiti.*

Acute Neuralgia. To be applied with a camel-hair pencil, alone or with soap liniment.

Linimentum Chloroformi.

(B. P.)

℞

Chloroformi
Linimenti Camphoræ ......partes æquales

Misce.

Nervine. Used in the same manner as *Linimentum Aconiti.*

Linimentum Iodi.

(B. P.)

℞

Iodi	ʒx
Potassii Iodidi	℥ss
Camphoræ	ʒij
Spiritûs Rectificati	f℥x

Solve.

Resolvent. Applied in the same manner as *Linimentum Aconiti.*

Liquor Ferri Hypophosphitis Compositus.

A Substitute for Parish's Chemical Food.

Ferrous Hypophosphite ($Fe\ 2PH_2O_2+6H_2O$)	2·77
Calcium Hypophosphite ($Ca\ 2PH_2O_2$)	3·5
Sodium Hypophosphite ($NaPH_2O_2+H_2O$)	3·5
Magnesium Hypophosphite ($Mg\ 2PH_2O_2+6H_2O$)	1·99
Hypophosphorous Acid (H_3PO_2)	1·66
Water	86·58
	100·00

Dr. Churchill states that phosphates in the form of tricalcic phosphate (which is the base of Parrish's preparation) can only be assimilated when the digestive functions are in order, and then only to a very limited extent. Moreover, the continued administration of large quantities of sugar is not conducive to perfect gastric function.

Dr. Churchill thought that a preparation similar in composition and properties, but which would be an actual solution of the hypophosphite salts prepared according to a definite process of chemical manipulation, *instead of being merely a suspension of the salts in syrup*, and having phosphorous in a higher and more active state of combination, might be obtained. The above formula seems in every way to meet his expectations.

Dose, 10 to 60 drops in raisin wine.

Mel Boracis.

℞

Sodæ Biboratis	ʒi
Mellis	℥i

Misce.

Detergent in Aphtha.

Mistura Acidi Gallici.

(T. H.)

℞

Acidi Gallici	ʒi
Glycerini..............................	ʒiv
Aquæ Destillatæ ....ad	℥vi

Misce.

Internal Astringent.—Dose, 1-6th part

Mistura Chloralis Hydratis.

(T. H.)

℞

Chloralis Hydratis	ʒii
Syrupi Aurantii Floris	ʒiv
Syrupi Tolutani	ʒiv
Aquæ Destillatæ	ad ℥vi

Misce.

Hypnotic.—Dose, 1-6th part; to be given largely diluted.

Mistura Ferri Aromatica.

(DR. WARING.)

℞

Pulveris Cinchonæ Pallidæ	℥j
Radicis Calumbæ	℥ss
Caryophyllorum Contusorum	ʒii
Ferri (Fine Iron Wire)	ʒiv
Aquæ Menthæ Piperitæ	℥xii

Macerate for three days, agitating occasionally; filter, add sufficient Peppermint Water to make 12½ ounces, then add 3 ounces of Compound Tincture of Cardamoms and ½ ounce of Tincture of Orange Peel.

An excellent Chalybeate tonic in debility with anæmia.

Dose, 1 to 2 ounces.

Mistura Ferri et Acidi Phosphorici.

(J. S.)

℞

Ferri Sulphatis	gr. xx
Acidi Phosphorici Diluti	ʒi
Aquæ Destillatæ	ad ℥vi

Misce.

Tonic.—Dose, 1-6th part.

Mistura Ferri c Strychnia.

(J. S.)

℞

Ferri Sulphatis	gr. xx
Liquoris Strychniæ	ʒss
Acidi Phosphorici Diluti	ʒi
Infusi Quassiæ	ad ℥vi

Misce.

Tonic and Nervine.—Dose, 1-6th part.

Mistura Guaiaci.

(B. P.)

℞

Pulveris Resinæ Guaiaci	
Sacchari Albi	aā ʒiv
Gummi Acaciæ	℥i
Aquæ Cinnamomi	ad ℥x

Misce.

In Rheumatic tooth-ache.—Dose, ½ to 1 ounce.

Mistura Neuralgica.

(J. S.)

1

℞

Ammonii Chloridi	ʒii
Tincturæ Gelsemii	ʒj
Tincturæ Aconiti	m. xx
Aquæ Destillatæ	ad ℥vj

Misce.

Nervine and resolvent.

Dose, a ¼ part three times a day.

2

℞

Ammoniæ Carbonatis	ʒss
Ammonii Chloridi	ʒii
Aquæ Menthæ Piperitæ	ad ℥vj

Misce.

Alterative and resolvent.—Dose, 1-6th part.

Mistura Potassii Bromidi.

(S. S. W.)

℞

Potassii Bromidi	ʒii
Spiritûs Ammoniæ Aromatici	℥ss
Misturæ Camphoræ	ad ℥xii

Misce.

Resolvent, narcotic and anæsthetic.

Dose, 1-12th part, largely diluted with water.

Mistura Potassæ Chloratis.

(J. S.)

℞

Potassæ Chloratis .... ʒi
Aquæ Destillatæ ....ad ℥vi

Misce.

Refrigerant and diuretic.

Dose, 1-6th part.

Mistura Potassii Iodidi.

(D. H. L.)

℞

Potassii Iodidi ....gr. xviii
Infusi Quassiæ .... ℥vj

Misce.

Alterative and resolvent.

Dose, 1-6th part.

Mistura Potassii Iodidi c Potassâ.

(C. H.)

℞

Potassii Iodidi .... ʒss
Potassæ Bicarbonatis .... ʒi
Infusi Quassiæ ....ad ℥vi

Misce.

Alterative and resolvent.

Dose, 1-6th part.

LIBRARY
[illegible] COLLEGE
TORONTO

Mistura Sodæ Hypophosphitis.

℞

Sodæ Hypophosphitis	gr. 60 ad 120
Aquæ Destillatæ	℥xii

Misce.

Tonic, alterative, stimulant.

Dose, 1 ounce.

Mistura Stomachica.

(J. S.)

℞

Sodæ Bicarbonatis...............	ʒi
Pulveris Rhei..................gr.	xviii
Tincturæ Cardamomi Compositæ	ʒiii
Aquæ Menthæ Piperitæ ...ad	℥vj

Misce.

Dyspepsia.—Dose, a 1-6th part three times a day, half-an-hour before meals.

Mistura Tonica.

(D. H. I.)

I

℞

Quiniæ Sulphatis ....gr.	vi
Acidi Sulphurici Diluti.......m.	xviii
Aquæ Cinnamomi	vj

Misce.

Tonic.—Dose, 1-6th part.

2

℞

Ferri Sulphatis	gr. vi
Acidi Sulphurici Diluti	m. xii
Magnesiæ Sulphatis	ʒii
Infusi Quassiæ	℥vj

Misce.

Tonic.—Dose, 1-6th part.

Pasta Arsenicalis.

(S.)

℞

Acidi Arseniosi	gr. 20
Morphiæ Acetatis	gr. 80
Creasoti, vel Acidi Carbolici	q. s.

Misce.

Strong escharotic. Used to produce death of the tooth pulp.

Pasta Arsenicalis.

(H.)

℞

Acidi Arseniosi	gr. xii
Morphiæ Acetatis	gr. ii
Olei Caryophillorum	guttæ iv

Creasoti q. s. ut fiat pasta.

Strong escharotic. Used to devitalize the tooth pulp.

By some practitioners the proportions of Arsenious Acid and Morphia are reversed.

TORONTO

Pasta Caustica.

(London Paste.)

(T. H.)

Caustic Soda and unslacked Lime in equal parts.

Pasta Pepsina.

(C.)

℞

Acidi Hydrochlorici	m. 1
Aquæ Destillatæ	m. 40
Pepsinæ Porci	q. s.

To be made into a paste and applied to a suppurating pulp.

Pilula Colocynthidis Compositæ.

(B. P.)

℞

Pulveris Colocynthidis	1 part
Aloes Barbadensis	2 parts
Pulveris Scammonii	2 parts
Potassæ Sulphatis	¼ part
Olei Caryophyllorum	¼ part
Aquæ Destillatæ	q. s. (about ¼ part)

Misce.—Fiat massa.

Aperient.—Dose, 5 to 10 grains.

Pilula Hydrargyri.

(B. P.)

℞

Hydrargyri	℥ij
Confectionis Rosæ	℥iij
Radicis Glycyrrhizæ Pulveris	℥j

Rub the Mercury with the confection of rose until metallic globules are no longer visible, then add the liquorice, and mix the whole well together.

Dose, Aperient, 3 to 8 grains.

Alterative, 1 to 3 grains.

Pilula Hydrargyri Subchloridi Composita.

(B. P.)

(*Plummer's Pills.*)

℞

Hydrargyri Subchloridi	1 part
Antimonii Sulphurati	1 part
Pulveris Guaiaci Resinæ	2 parts
Olei Ricini	1 part

Misce.

Alterative.—Dose, 5 to 10 grains.

Pilula Neuralgica.

(G.)

℞

Quiniæ Sulphatis	gr. 1
Ferri Potassio-tartratis	gr. 2
Morphiæ Acetatis	gr. $\frac{1}{12}$ to $\frac{1}{20}$

Misce.—Fiat Pilula.

Periodic Neuralgia.

Dose, One pill to be taken every hour until an expected paroxysm has been missed.

Pilula Podophylli.

(J. S.)

℞

Resinæ Podophylli	gr. ¼
Extracti Hyoscyami	gr. i
Pulveris Rhei	gr. iii

Misce.—Fiat pilula.

Cholagogue purgative. One pill at bedtime.

Pilula Rhei Composita.

(B. P.)

℞

Pulveris Rhei	℥iii
Pulveris Aloes Socotrinæ	℥ii¼
Pulveris Myrrhæ	℥iss
Saponis Duri	℥iss
Olei Menthæ Piperitæ	ʒiss
Theriacæ	℥iv

Misce. S. A.

Aperient.—Dose 5 to 10 grains.

Pulvis Aluminis cum Amylo.

(T. H.)

℞

Aluminis
Amyli .... partes æquales

Misce.

For insufflation.

Solutio Guttæ Perchæ.

(J. S.)

℞

Guttæ Perchæ (Truman's) ... ʒii vel. q. s.
Chloroformi .... ℥i

Solve.

This preparation is useful to paint recent osteo stoppings during their hardening. Bibulous paper saturated with it, forms an excellent capping material for exposed pulps where the "oxychloride" stopping is used, protecting it effectually from its escharotic action.

Spiritus Acidi Tannici.

(J. S.)

℞

Acidi Tannici .... ʒi
Alcoholis .... ʒiv

Solve.

For application to softened and sensitive dentine.

Spiritus Ammoniæ Aromaticus.

℞

Ammoniæ Carbonatis	℥viii
Liquoris Ammoniæ Fortis ...	℥iv
Olei Myristicarum	ʒiv
Olei Limonum.....................	ʒvi
Spiritûs Vini Rectificati.........	Ovi
Aquæ Destillatæ ....ad	Oiii

Misce.—Distil seven pints. Sp. gr. 0·870.

Stimulant. Dose, 20 to 60 minims in water.

Spiritus Camphoræ.

(B. P.)

℞

Camphoræ	℥i
Spiritûs Rectificati	f℥ix

Solve.

Stimulant and Sedative. Dose 10 to 30 minims in water.

Spiritus Rectificatus Fortis.

(J. S.)

℞

Potassæ Carbonatis	℥i
Spiritûs Rectificati ....ad	℥x

Misce.

Macerate for a few days, frequently agitating, then pour off the supernatant liquor. This is not so strong as Alcohol, but is a very good substitute.

Syrupus Calcis Hypophosphitis.

(PR.)

℞

Calcis Hypophosphitis	℥j
Aquæ Destillatæ..................	f℥ixss
Sacchari Albi	℥xij
Extracti Fluidi Vanillæ	f℥ss

Dissolve the salt in the water, filter, add the sugar, dissolve by the aid of heat, and add the Vanilla. Each drachm contains 3½ grains of Hypophosphite of Lime.

Dose, from 1 to 4 teaspoonsful. In nervous and general debility.

Syrupus Ferri Hypophosphitis.

(P.)

℞

Ferri Sulphatis...............	185 grs.
Sodæ Carbonatis	240 grs.
Acidi Hypophosphorosi (sp. gr. 1·036)	f℥iiiss, or q. s.
Aquæ	q. s.
Sacchari.......................	℥xij

Dissolve the Sulphate of Iron and Carbonate of Soda, separately, in 4 fluid ounces of water, and mix the solutions. Wash the Precipitated Carbonate of Iron with water containing Sugar in Solution, and drain it on a calico filter, then transfer to a basin, add a small portion of water, heat gently, adding Hypophosphorous acid until it forms a clear solution; then add water until it measures 8 fluid ounces, dissolve the sugar in it, and flavour to taste. Each drachm contains nearly gr. i. of Hypophosphite of Iron.

Dose, 1 to 2 drachms. In nervous and general debility.

Syrupus Calcis Lacto-Phosphatis.

(N.)

Concentrated Lactic Acid...	1 ounce
Magma of freshly precipitated Phosphate Lime ...	q. s.
Orange Flower Water	1½ ounce
Sugar	11 ounces
Distilled water ....up to	8 ounces

To the magma transferred to a mortar, the Lactic Acid is added, and by constant stirring made to dissolve the lime to saturation; the acid when saturated being still notably sour to the taste. The Orange Flower Water and Distilled Water are then added to make the required amount: as the lime does not all go into solution, it is filtered, and water added through the filter to make up the measure. After the solution of the Sugar is complete, the preparation is again filtered. Heat should not be used to dissolve the sugar.

Of a light straw colour, pleasant acid taste and agreeable flavour.

Dose.

Syrupus Ferri Iodidi.

(B. P.)

℞

Ferri Tracti in Filum	℥j
Iodi	℥ij
Sacchari Albi	℥xxviij
Aquæ Destillatæ	℥xiij

Digest the Iron and the Iodine together in a flask with three ounces of the water, applying a gentle heat until the froth becomes white; then filtering whilst still hot into a syrup made by dissolving the sugar in ten ounces of water, and mix. Each fluid drachm contains 4½ grains of Iodide of Iron.

Alterative and Tonic. Dose, 20 to 60 minims.

Tinctura Aconiti.

(B. P.)

℞

Radicis Aconiti Contusæ	℥iiss
Spiritûs Rectificati	Oj

Macerate for 48 hours with ¾ of the Spirit, agitating occasionally, pack in a percolator and let it drain, then pour on the remaining spirit; when it ceases to drop, press the marc and add spirit to make up 20 ounces.

Anodyne. Dose, 5 to 15 minims.

Tinctura Actææ.

(R.)

℞

Radicis Actææ Contusæ	℥iv
Spiritûs Tenuioris	℥xvi

Macerate 14 days and strain.

Dose, 30 to 60 minims for neuralgia and rheumatism.

Tinctura Arnicæ.

(B. P.)

℞

Radicis Arnicæ Contusæ	℥j
Spiritûs Rectificati..................	Oj

Prepared in a similar manner to *Tinctura Aconiti.*

Nerve stimulant. Dose, ½ to 1 fluid drachm.

Tinctura Camphoræ Composita.

(B. P.)

℞

Opii Contusæ	
Acidi Benzoici	aa. grs. xl
Camphoræ	grs. xxx
Olei Anisi	fʒss
Spiritûs Tenuioris...............	Oj

Macerate 7 days, strain, wash the marc with spirit to make up 20 ounces, and filter.

Sedative. Dose, 15 to 60 minims.

Tinctura Cinchonæ Flavæ.

(B. P.)

℞

Corticis Cinchonæ Flavæ Contusæ	℥iv
Spiritûs Tenuioris	Oj

Prepared in a similar manner to *Tinctura Aconiti.*

Tonic. Dose, ½ to 2 fluid drachms.

Tinctura Gelsemii.

(S.)

℞

Radicis Gelsemii Contusæ	℥ii
Spiritûs Rectificati	℥xx

Moisten the coarsely powdered root with ten ounces of the spirit, and allow the mixture to stand for 24 hours. At the end of that time pack in a percolator, and add the remaining ten ounces of spirit. When the fluid has ceased to flow, remove the contents of the percolator and press them. Add the pressed liquid to that obtained by percolation, filter, and make up with rectified spirit to a pint.

The tincture contains only a trace of tannin, and may be given with any of the preparations of iron.

Nerve sedative. Dose, 10 to 20 minims.

Tinctura Guaiaci Ammoniata.

(B. P.)

℞

Resinæ Guaiaci	℥iv
Spiritûs Ammoniæ Aromatici	q. s.

Macerate seven days, filter, and wash the filter with the spirit to make up 20 ounces.

Stimulant, diaphoretic and alterative. Dose, ½ to 1 fluid drachm.

Tinctura Hamamelis.

(S. C. P.)

℞

Corticis Hamamelis virg.	2 parts
Spiritûs Tenuioris	20 parts

Macerate for 7 days and strain.

Astringent. Dose, 2 to 5 minims in water.

Tinctura Krameriæ.

(B. P.)

℞

Radicis Krameriæ Contusæ	℥iiss
Spiritus Tenuioris	Oj

Prepared in a similar manner to *Tinctura Aconiti.*

Astringent. Dose, ½ to 2 fluid drachms.

Tinctura Maticæ.

(S. C. P.)

℞

Foliorum Maticæ Contusæ	1 part
Spiritûs Tenuioris	5 parts

Macerate fourteen days, strain, express and filter.

Astringent. Dose, from 1 to 2 drachms.

Tinctura Myrrhæ.

(B. P.)

℞

Gummi Myrrhæ Contusæ ...	℥iiss
Spiritûs Rectificati	Oj

Prepared in a similar manner to *Tinctura Aconiti.*

Stimulant tonic. Dose, 10 to 30 minims.

Tinctura Nucis Vomicæ.

(B. P.)

℞

Nucis Vomicæ	℥ij
Spiritûs Rectificati	Oj

The Nux Vomica is first submitted to the action of steam, dried, and powdered; the tincture is then prepared in a similar manner to the *Tinctura Aconiti.*

Nervine. Dose, 10 to 20 minims.

Tinctura Opii.

(B. P.)

℞

Opii Contusæ	℥iss
Spiritûs Tenuioris	Oj

Macerate for seven days, with occasional agitation, then strain, press, filter, and add proof spirit to make twenty ounces.

Anodyne. Dose 5 to 40 minims.

The soluble matter of 4 grains of Opium is contained in rather less than one fluid drachm.

Tinctura Pyrethri.

(B. P.)

℞

Radicis Pyrethri Contusæ	℥iv
Spiritûs Rectificati	Oj

Prepared in a similar manner to the *Tinctura Aconiti.*

Sialogogue.

Tinctura Quillayæ.

(C.)

℞

Corticis Quillayæ Contusæ	℥iv
Spiritûs Rectificati	℥xx

Digest for three days, and then strain.

Used for making a saponaceous tooth-wash. (See also *Quillaya Tooth-Wash*, page 355).

Tinctura Valerianæ Ammoniata.

(B. P.)

℞

Rad. Valerianæ Contusæ	℥iiss
Spiritûs Ammoniæ Aromatici	Oj

Prepared in a similar manner to *Tinctura Opii.*

Stimulant and sedative. Dose, ½ to 1 fluid drachm.

Tooth Wash (Mialhe's).

(See *Mialhe's Dentifrice*, page 312.)

Tooth Wash (Quillaya).

(AMER. JOURN. PHARMA. 1880.)

An excellent tooth-wash, containing glycerine is made as follows :—

℞

Soap Bark, ground	4 ounces
Glycerine	3 ditto
Diluted alcohol	sufficient for 2 pints
Oil of Gaultheria	
Oil of Peppermint	āā 20 drops

Macerate the soap bark in the mixture of glycerine and dilute alcohol for three or four days, and filter through a little magnesia previously triturated with the volatile oils.

Thus made, a better preparation is obtained than by macerating the bark in the dilute alcohol, and adding the glycerine afterwards.

(See also *Tinctura Quillayæ*, page 354.)

Unguentum Veratriæ.

℞

Veratriæ	ʒi
Olei Olivæ	ʒi
Adipis	℥iss

Misce.

Neuralgia, (This is 1 in 13, whereas the B.P. preparation is 1 in 60); it must therefore be lightly smeared, and not rubbed, upon the seat of pain.

Vapor Acidi Carbolici.

(T. H.)

℞

Acidi Carbolici	ʒxxi
Aquæ Destillatæ	ʒiii

Antiseptic. Very serviceable in syphilitic ulceration.

For steam inhalation.—A teaspoonful in a pint of water at 150° F. for each inhalation.

For hot dry inhalation.—A teaspoonful to be poured into the apparatus for dry inhalation, and the vapour inhaled.

For cold inhalation.—A teaspoonful in a pint of water at 80° F. to 100° F.

Vapor Amyl Nitritis.

(T. H.)

℞

Amyl Nitritis	m. xxiv
Spiritûs Rectificati	℥iii

Misce.

Antispasmodic. Very valuable in some cases of Asthma, *and Spasm of the Glottis.*

A teaspoonful in a pint of water at 100° F. for each inhalation. Dry inhalation produces *giddiness*, &c.

ANTIDOTE.—The *Canadian Journal of Pharmacy* states that hypo-nitrous ether has been suggested by Dr. Squibb as an antidote in poisoning by nitrite of amyl.

Vapor Thymolis.

(T. H.)

℞

Thymolis Hydratis	gr. xx
Spiritûs Rectificati	ʒiii
Magnesiæ Carbonatis	gr. x
Aquæ Destillatæ	ad ℥iii

Misce.

A strong stimulant. Very useful in chronic glandular pharyngitis and laryngitis.

A teaspoonful in a pint of water at 150° F. for each inhalation.

Vinum Antimoniale.

(B. P.)

℞

Antimonii Tartarati	grs. xl
Vini Xerici	Oj

Solve.

Dose, 5 minims to 1 fluid drachm.

Vinum Colchici.

(B. P.)

℞

Colchici Cormi	4 parts
Vini Xerici	20 parts

Macerate 7 days and strain.

Dose, 10 to 30 minims in rheumatism.

Vinum Opii.

(B. P.)

℞

Extracti Opii	℥j
Corticis Cinnamomi contusæ	
Caryophylorum contusorum aa.	grs. lxxv
Vini Xerici	Oj

Macerate for seven days, in a closed vessel, with occasional agitation, and filter.

It contains nearly 22 grains of Extract of Opium in 1 fluid ounce.

Dose, 1 to 40 minims.

LIST OF ABREVIATIONS.

The following is a List of Abbreviations Contractions, and Words more or less frequently met with in prescriptions :—

A. aa. ana (ανα), of each ingredient.

Abdom. Abdomen. The belly.

Abs. febr. Absente febre. In the absence of the fever.

Ad 2 vic. Ad duas vices. At twice taking.

Ad 3tiam vicem. Ad tertiam vicem. For three times.

Ad. To, or up to.

Add. Adde, or *addantur.* Add, or let be added.

Adst. febre. Adstante febre. When the fever is on.

Adv. Adversum. Against.

Aggred. febre. Aggrediente febre. While the fever is coming on.

Altern. horis. Alternis horis. Every other hour.

Aq. bull. Aqua bulliens. Boiling water.

Aq. com. Aqua communis. Common water.

Aq. pluv. Aqua pluvialis. Rain water.

Aq. ferv. Aqua fervens. Hot water.

Aq. font. Aqua fontana, or *Aqua fontis*, or *Aqua fontalis.* Spring water.

Bis. ind. Bis indies. Twice a day.

Bib. Bibe. Drink (thou).

B.M. Balneum Mariæ, or *Balneum Maris.* A sea water bath.

Bull. Bulliat, or *bulliant.* Let boil.

B.V. Balneum vaporosum, or *Balneum vaporis.* A vapour bath.

C. Cum. With.

Cap. Capiat. Let the patient take.

Coch. Cochleare. A spoonful : a table spoonful.

Cochleat. Cochleatim. By spoonfuls.

Coch. ampl. Cochleare amplum. A large (or table) spoonful. Half a fluid ounce.

Coch. magn. Cochleare magnum. A large spoonful.

Coch. med. Cochleare medium. } A middling
Coch. mod. Cochleare modicum. } or moderate spoonful : that is, a dessert spoonful. Two fluid drachms.

Coch. parv. Cochleare parvum. A small (or tea) spoonful. One fluid drachm.

Col. Cola. Strain.

Colent. Colentur. Let them be strained.

Color. Coloretur. Let it be coloured.

Comp. Compositus. Compounded.

Con. Concisus. Cut.

Cong. Congius. A gallon.

Cons. Conserva. A conserve ; also, Keep thou.

Cont. rem. Continuenter remedia. Let the medicines be continued.

Coq. Coque. Boil. *Coquantur.* Let them be boiled.

Cort. Cortex. Bark.

C. v. Cras vespere. To-morrow evening.

C. m. s. Cras mane sumendus. To be taken to-morrow morning.

C. n. Cras nocte. To-morrow night.

Crast. Crastinus. For to-morrow.

Cuj. *Cujus.* Of which.

Cyath. theæ. *Cyatho theæ.* In a cup of tea.

Cyath. *Cyathus*, vel.
C. vinar. *Cyathus vinarius.* } A wine glass. Two fluid ounces.

Deb. spiss. *Debita spissitudo.* A proper consistence.

Dec. *Decanta.* Pour off.

Decub. *Decubitûs.* Of lying down.

De d. in d. *De die in diem.* From day to day.

Deglut. *Deglutiatur.* May be (*or* let be) swallowed.

Dej. alvi. *Dejectiones alvi.* Stools.

Det. *Detur.* Let it be given.

Dieb. alt. *Diebus alternis.* Every other day.

Dieb. tert. *Diebus tertiis.* Every third day.

Dil. *Dilue, Dilutus, Dilute.* Dilute (thou), diluted.

Dim. *Dimidius.* One half.

D. in. p. æq. *Dividatur in partes æquales.* Let it be divided into equal parts.

D. P. *Dir. prop.* *Directione propria.* With a proper direction.

Donec. alv. sol. fuer. *Donec alvus soluta fuerit.* Until the bowels shall be opened.

Donec dol. neph. exulav. *Donec dolar nephriticus exulaverit.* Until the nephritic pain be removed.

D. *Dosis.* A dose.

Ejusd. *Ejusdem.* Of the same.

Elect. *Electuarium.* An electuary.

Enem. *Enèma.* A clyster. *Enemata.* Clysters.

Exhib. *Exhibeatur.* Let it be exhibited.

F. Fac. Make. *Fiat, fiant.* Let be made.

F. pil xij. Fac pilulas duodecim. Make 12 pills.

Feb. dur. Febre durante. During the fever.

F. H. Fiat haustus. Let a draught be made.

Fl. Filtrum. A filter. *Filtra.* Filter (thou.)

Fl. Fluidus. Liquid; also, By measure.

F. M. Fiat Mistura. Let a mixture be made.

F. S. A. Fiat secundum artem. Let it be made according to art.

Gr. Granum. Grain. *Grana.* Grains.

Gtt. Gutta. A drop. *Guttæ.* Drops.

Gutt. quibusd. Guttis quibusdam. With a few drops.

Guttat. Guttatim. By drops.

H. D. or *Hor. decub. Hora decubitûs.* At the hour of going to bed.

H. S. or *Hor. som. Hora somni.* Just before going to sleep; *or* On retiring to rest.

Hor. 11*mâ. mat. Horâ undecimâ matutinâ.* At the eleventh hour in the morning.

Ind. Indies. From day to day; *or* Daily.

In pulm. In pulmento. In gruel.

Inc. Incide: incisus. Cut (thou); being cut.

Inf. Infunde. Pour in.

Lat. dol. Lateri dolenti. To the side that is painful.

M. Misce. Mix.

Mane pr. Mane primo. Very early in the morning.

Man. Manipulus. A handful.

Mensurâ. By measure.

Min. Minimum. The 60th part of a drachm measure. *Minutum.* A minute.

M.P. Massa pilularum. A pill mass.

M.R. Mistura. A mixture.

Mic. pan. Mica panis. Crumb of bread.

Mitt. Mitte. Send. *Mittatur* or *Mittantur.* Let be sent.

More dict. More dicto. In the manner directed.

Mor. sol. More solito. In the usual manner.

No. Numero. In number.

O. Octarius. A pint.

Omn. hor. Omni horâ. Every hour.

Omn. bid. Omni biduo. Every two days.

Omn. bih. Omni bihorio. Every two hours.

O.M. or *Omn. man. Omni mane.* Every morning.

O.N. or *Omn. noct. Omni nocte.* Every night.

Omn. quadr. hor. Omni quadrante horæ. Every quarter of an hour.

Ov. Ovum. An egg.

P. æ. Part. æqual. Partes æquales. Equal parts.

P. Pondere. By weight.

Ph. L. Pharmacopœia Londoniensis.

Part. vic. Partitis vicibus. In divided doses.

Per op. emet. Peractâ operatione emetici. When the operation of the emetic is finished.

Pocul. Poculum. A cup. A teacup holds from four to six ounces of distilled water.

Pocill. Pocillum. A little cup.

Post sing. sed. liq. Post singulas sedes liquidas. After every loose stool.

Ppt. Præparatus. Prepared.

P. r. n. *Pro re nata.* According as circumstances arise: that is, Occasionally.

P. rat. æt. *Pro ratione ætatis.* According to the age of the patient.

Pulv. *Pulvis; pulverizatus.* A powder; powdered.

Q. s. *Quantum sufficiat*, or *quantum satis.* As much as is sufficient.

Quor. *Quorum.* Of which.

Q. V. *Quantum vis, quantum volueris.* As much as you will.

Red. in pulv. *Redactus in pulverem.* Powdered.

Redig. in pulv. *Redigatur in pulverem.* Let it be reduced to powder.

Repet. *Repetatur, repetantur.* Let be repeated.

S. A. *Secundum artem.* According to art.

S. N. *Secundum naturam.* According to nature.

Semidr. *Semidrachma.* Half a drachm.

Semih. *Semihora.* Half an hour.

Sesunc. *Sesuncia.* An ounce and a half.

Sesquih. *Sesquihora.* An hour and a half.

Si op. sit. *Si opus sit.* If there be occasion.

Si. vir. perm. *Si vires permittant.* If the strength will bear it.

Sig. *Signatura.* A label.

Sing. *Singulorum.* Of each.

Ss. *Semi.* A half.

St. *Stet.* Let it stand. *Stent.* Let them stand.

Sum. *Sume, sumat, sumatur, sumantur, sumendus.* Take thou, let them take, let be taken, to be taken.

S. V. R. *Spiritus vini rectificatus.* Rectified spirit of wine.
S. V. T. *Spiritus vini tenuior.* Proof spirit.
Tabel. *Tabella* (dim. of *tabula*, a table.) A lozenge.
Trit. *Tritura.* Triturate.
Tra. *Tinctura.* Tincture.
Troch. *Trochisci.* Troches *or* lozenges.

INDEX OF DISEASES.

Names in Italics refer to Pharmacopœia Preparations.

ABSCESS.

Aconite 97, Aromatic Sulphuric Acid 94, Calcii Sulphidum 143, Carbolic Acid 80, Iodoform 198, Iodum 200, Oleum Eucalypti 238, Potassæ Nitras 254, Potassæ Permanganas 255, Resorcin 264, Sanitas 267, Thymol 278, *Guttæ Creasoti et Iodi*, 326.

ANÆMIA.

Calcis Hypophosphis 140, Ferri et Quiniæ Citras 175, Ferri et Strychniæ Citras 176, Ferri Perchloridum 179, Ferri Phosphas 181, Ferri Sulphas 183, Ferrum Redactum 182, *Liquor Ferri Hyphophos. Co.* 334, *Mistura Ferri Aromat.* 336, *Mist. Ferri c̄ Strychnia* 337, *Mist. Ferri et Acid. Phosphor.* 337.

ANTRUM, DISEASE OF.

Argenti Nitras 122, Carbolic Acid 79, Iodine 200, Sanitas 266, Tannic Acid 96.

APHTHA.

Garg. Pottassæ Chloratis 320, *Garg. Sodæ Hyposulphitis* 322, Liq. Sodæ Chloratæ 208, Magnesia 209, *Mel Boracis* 335, Quiniæ Sulphas 262, Salicylic Acid 90, Sodæ Biboras 270, Sodæ Bicarbonas 271, Sulphurous Acid 92, Tannin, 69.

APNŒA.

Artificial Respiration 226, Amyl Nitrite 119, *Vapor Amyl Nitritis* 356.

CANCRUM ORIS.

Arsenious Acid 125, Calomel 195, Calx Chlorata 147, Hydrochloric Acid 85, Liq. Sodæ Chloratæ 208, Nitric Acid 86, Potassæ Chloras 252, Quiniæ Sulphas 262, Zinci Sulphas, 284.

CARIES OF BONE.

Aromatic Sulphuric Acid 93, Potassii Iodidum 257.

CARIES, DENTAL.

See SENSITIVE DENTINE and TOOTHACHE.

CONSTIPATION.

Aloes 106, Calomel 195, Colocynth 164, *Haustus Alöes—H. Aperiens—H. Rhei* 331, *Oleum Crotonis* 236, *Pilula Colocynth. Co.* 342, *P. Hydrarg.—P. Hydrarg. Subchlor. Co.* 343, *P. Podophyli—P. Rhei Co.* 344, Podophyli Resina 249.

CONVULSIONS.

(Bromide of Potassium, Bicarbonate of Soda, Hydrate of Chloral) 242, Camphoræ Monobromidum 150, Chloroform 160, *Mistura Chloralis Hydrat.* 336, Opium 242, Potassii Bromidum 256, Potassii Iodidum 257.

DENTAL CARIES.

See SENSITIVE DENTINE and TOOTHACHE.

DENTITION.

Calcis Hypophosphitis 140, Calx 145, *Calx Saccharata* 306, Quiniæ Hypophosphis 261, *Syrupus Calcis Hypophosphitis* 347, *Syr. Calcis Lacto Phosphatis* 348.

DIARRHŒA.

Acid. Sulphuricum Aromat. 93, Acid. Tannicum 95, Aqua Calcis 145, *Calx Saccharata* 306, Camphor 149, Catechu 155, Ipecacuanha 202, Plumbi Acetas 247.

DYSPEPSIA.

Aloes 106, Calx 145, Ferri Phosphas 182, Magnesiæ Sulphas 210, *Mist. Stomachica* 340, *Mist. Tonica* 340—1, Quiniæ Sulphas 262, Sulphuric Acid 91, Sulphurous Acid 93.

GLANDULAR ENLARGEMENT.

Ammonii Chloridum 114, Ammonii Iodidum 115, Arnica 124, Calx 145, Ferri Iodidum 177, Hydrargyrum 192, Iodoformum 198, Iodum 200, Liq. Sodæ Chloratæ 208, Potassæ Bicarbonas 250, Potassii Iodidum 256, Syr. Ferri Iodidi 349.

GUM, GROWTHS UPON.

Argenti Nitras 122, Acidum Nitricum 86, Burnt Alum 108, Chromic Acid 83, Cupri Sulphas 169, *Guttæ Cupri Sulphatis* 327, Ferri Perchloridum 179, *Pasta Caustica* 342, Potassæ Chloras 252, Sodæ Biboras 270.

GUM, INFLAMMATION OF (Gingivitis).

Alumen 108, *Garg. Potassæ Chloratis c̄ Arnicâ* 320, Hamamelis 188, Hydrargyri Perchlor. 189, Krameria 207, Liq. Sodæ Chloratæ 208, Myrrha 216, Potassæ Chloras 252, Potassæ Nitras 254, Tannin 96.

GUM, RECESSION OF.

Chromic Acid 83, *Glycerinum Acidi Tannici* 323, Iodum 201, Tannin 95.

GUM, SPONGY.

Catechu 155, Iodine 200, Krameria 207, *Mialhe's Dentifrice* 312, Myrrha 216, Oleum Eucalypti 239, Sodæ Phenas 274, Tannin 95, Zinci Sulphas 284.

GUM, ULCERATION OF.

Argenti Nitras 122, Arnica 124, Calx 145, Calx Chlorata 147, Catechu 155, Carbolic Acid 80, Chromic Acid 83, Cupri Sulphas, 169, *Garg. Sodæ Hyposulphitis* 322-3 *Glycer. Potassæ Chloratis* 324, *Glycer. Sodæ Sulphatis* 324, *Guttæ Acidi Tannici* 324, *Guttæ Thymolis* 330, Hamamelis 188, Hydrargyri. Perchlor. 189, Hydrargyrum 193, Hydrochloric Acid 85, Iodum 201, Magnesia 209, Myrrha 216, Oleum Eucalypti 239, Potassæ Chloras 252, Salicylic Acid 90, Sodæ Phenas 273, Tannin 96, Zinci Sulphas 284.

HÆMORRHAGE.

Acidum Gallicum 84, Acid. Sulphuricum 91, *Acid. Sulphuricum Arom. ē Acido Tannico* 306, Acid. Tannicum 95, Alcohol 104, Alumen 108, Argenti Nitras 122, Chloralum 109, *Collodium Flexile Stypticum* 308, *Collodium Stypticum* 308—9, *Cotton Styptic* 310. Ferri Perchloridum 179, Ferri Persulphatis 181, Hamamelis 188, 352, Krameria 207, 352, Maticæ Foliæ 210, 353, *Mist. Acid. Gallici* 335, Oleum Eucalypti 238, Plumbi Acetas 247, Potassæ Chloras 352, Sodæ Phenas 273.

INFLAMMATION.

Aconite 97, Alumen 108, Argenti Nitras 122, Calcii Sulphidum 142, Hydrargyrum 193—5, Liq. Ammoniæ Acet. 110, Opium 241, Potassii Iodidum 257, Resorcin 264.

LEAD POISONING.

Acid. Sulphuricum Dil. 91, Alumen 108, Nux Vomica 276, Potassii Iodidum 256.

NECROSIS.

Aromatic Sulphuric Acid 94, Carbolic Acid 79, Oleum Eucalypti 238, Potassæ Permanganas 254, Potassii Iodidum 257, Resorcin 264, Sanitas 266, Zinci Chloridum, 283.

NEURALGIA.

Acidum Arseniosum 126, Acid. Salicylicum 89, Aconite 97, 332, Actæa 99, Ammoniæ Valerianas 113, Ammonii Chloridum 114, Amyl Nitris 119, Belladonna 129, Beberiæ Sulphas 131, Butyl Chloral Hydrate 137, Calcis Hypophosphis 140, 347, Cannabis Indica 152, *Chloral Camphorata* 307, Chloral Hydrate 157, 336, Chloroform 161, Colchicum 166, Cupri Sulphas 168, Digitalis 171, Ferri Perchloridum 179, Gelsemium 185, 351, Guaiacum 187, Hyoscyamus 196, Iodoform 198. *Linimentum Aconiti* 332, *Lin. Anodynum*, *Lin.*

Belladonnæ, Lin. Chloroformi 333, *Mistura Neuralgica* 338, Morphia 215, Nux Vomica 276, 353, Oleum Cajuputi 235, Ol. Crotonis 236, Ol. Morrhuæ 240, Opium 241, 354, 358, Phosphorus 246, Physostigma. Faba 246, *Pil Neuralgica* 344, Potassii Bromidum 255, Potassii Iodidum 257, Pyrethrum 258, Quiniæ Sulphas, 262, Sinapis 269, Sodæ Bicarbonas 271. Stramonium 169, Thymol 278, Tonga 279, *Unguentum Veratriæ* 356, Valeriana 280, 355, Veratria 282, Zinci Valerianas 285.

PERIOSTITIS.

Aconite 97, Ammonii Chloridum 114, Calcii Sulphidum 143, Carbolic Acid 80, *Collidum c̄ Cantharide* 307, Iodum 200, Pottassii Iodidum 257.

PTYALISM.

Calx Chlorata 147, Catechu 155, *Garg. Potassæ Chloratis* 320, *Garg. Sodæ Chloratæ* 321, Guaiacum 187, Iodum 200, Opium 242, Potassæ Chloras 253, Quillaya 260, 354, 355, Zinci Sulphas 284.

PULP, EXPOSED.

Acid. Arseniosum 126, Acid. Carbolicum 79, Acid. Nitricum 86, Aconite 97, Argenti Nitras 123, *Guttæ Ætheris et Acidi Tannici* 325, *Gtt. Anodynæ* 325, *Gtt. Camphoræ et Chloroformi* 325, *Gtt. Creasoti et Morphiæ* 327, Morphia 216, Oleum Eucalypti 238, *Pasta Arsenicalis* 341 *Pasta Pepsina* 342, Pepsine 244, Resorcin 264, Sanitas 266, Sodæ Bicarbonas 271, *Sol. Guttæ Perchæ* 345.

PULP, SUPPURATING.
Acidum Arseniosum 125, Acid. Carbolicum 79, Acid. Salicylicum 90, *Guttæ Eucalypti et Iodoformi* 327, Iodum 201, Iodoformum 198, Menthol 212, Oleum Eucalypti 238, *Pasta Arsenicalis* 341, *Pasta Pepsina* 342, Pepsine 244, Potassæ Permanganas 255, Resorcin 264, Sanitas 267, Thymol 278.

PYORRHŒA ALVEOLARIS (Riggs' Disease).
Acidum Carbolicum 79, Acid. Sulphuricum Aromat. 93, *Garg. Acid. Carbolici* 313, *Garg. Acid. Carbol. c̄ Iodo* 314, Iodum 201.

RHEUMATISM.
Acidum Salicylicum 89, Aconite 97, Actæa 99, Ammonii Chloridum 114, Arnica 124, Chloral Hydrate 157, Colchicum 166, Gelsemium 185, Guaiacum 187, *Mistura Guaiaci* 337, Nux Vomica 276, Physostigmatis Faba 247, Potassæ Bicarbonas 250, Potassii Iodidum 257, Pyrethrum 258, Resorcin 264.

SCROFULA.
Acidum Hydrochloricum 85, Acid. Nitricum 86, Acid. Phosphoricum 88, Calcii Sulphidum 143, Ferri Iodidum 177, Ferri Perchloridum 179, *Mistura Potassii Iodidi c̄ Potassâ* 339, Oleum Morrhuæ 240, Potassii Bromidum 156, Potassii Iodidum 256, *Syr. Ferri Hypophosphitis* 347, *Syr. Ferri Iodidi* 349.

SENSITIVE DENTINE.

Acidum Arseniosum 126, Acid. Carbolicum 79, Acid. Chromicum 82, Acid. Tannicum 96, Alcohol 104, Argenti Nitras 123, Calcis Carb. Præcip. 139, *Chloral Camphorata* 307, Cobalt 165, *Guttæ Acid. Tannici* 324, *Gtt. Ætheris et Acid. Tannici* 325, *Gtt. Anodynæ* 325, *Gtt. Camphoræ et Chloroformi* 325, Oleum Eucalypti 238, *Solutio Guttæ Perchæ* 345, *Spir. Acid. Tannici* 345, Zinci Chloridum, 283.

SPONGY GUM.

See GUM, SPONGY.

SUPPURATION.

Acidum Carbolicum 79, Aconite 97, Calcii Sulphidum 142, Calx 145, *Guttæ Creasoti et Iodi* 326, Iodoformum 198, Iodum 200, Menthol 212, Oleum Eucalypti 238, Resorcin 264, Sanitas 266, Thymol 278.

SUPPURATION OF PULP.

See PULP, SUPPURATION OF.

SYNCOPE.

Ammonia Carbonate 111, Ammon. Liquor 112, *Aromatic Spirits of Ammonia* 112, 346, Amyl Nitris 119.

TARTER.

Acidum Hydrochloricum Dil. 85, Acid. Sulphuricum Aromaticum 93.

THRUSH.

Acidum Salicylicum 90, Acid. Sulphurosum 92

Garg. Sodæ Hyposulphitis 322, *Glycerinum Sodæ Sulphitis* 324, Glycer. Boracis, 323, Sodæ Biboras 270.

TONSILITIS.

Acidum Gallicum 84, Acid. Hydrochloricum Dil. 85, Acid. Sulphurosum 92, Acid. Tannicum 96, Actæa 99, Alumen 108, Ammonii Iodidum 115, Amyl Hydride 118, Catechu 155, *Garg. Acid. Gallici c̄ Chloro.* 314, *Garg. Thymolis* 322, Guaiacum 187, Hydrargyri Perchloridum 189, Krameria 207, Potassæ Chloras 252, Potassæ Nitras 254, Potassæ Permanganas 255, Pyrethrum 258, Sanitas 266, Sinapis 269, *Vapor Thymolis* 357, Zinci Sulphas 284.

TOOTHACHE.

Acidum Carbolicum 79, Acid. Tannicum 96, Aconite 98, Alumen 108, Catechu 155, *Chloral Camphorata* 307, Chloral Hydrate 157, Chloroformum 162 ; *Guttæ Ætheris et Acid. Tannici* 325, *Gtt. Anodynæ* 325, *Gtt. Camphoræ et Chloroformi* 325, *Gtt. Creasoti et Camphoræ* 326, *Gtt. Creasoti et Morphiæ* 327, *Gtt. Odontalgiæ* 328—9, Menthol 213, *Mistura Guaiaci* 337, Morphia 215, Oleum Cajuputi 235, Ol. Caryophyli 236, Ol. Eucalypti 238, Opium 242, Potassæ Permanganas 255, Pyrethrum 258, Sinapis 269, Sodæ Bicarbonas 271, Spilanthes Oleracea 274.

ULCERATION OF MOUTH.

Acidum Carbolicum 80, Acid. Hydrochloricum 85,

Acid. Salicylicum 90, Acid. Tannicum 95, Argenti Nitras 122, Arnica 124, Calx 145, Calx Chlorata 147, Catechu 155, Cupri Sulphas 169, *Garg. Boracis* 318, *Garg. Hydrarg. Perchlor.* 319, *Garg. Potassæ Chloratis* 320, *Garg. Sodæ Hypophosphitis* 322, *Glycerinum Boracis* 323, *Glycer. Potassæ Chloratis* 324, *Glycer. Sodæ Sulphitis* 324, *Guttæ Acid. Tannici* 324, *Gtt. Thymolis* 330, Hamamelis 188. Liq. Sodæ Chloratæ 208, Magnesia 209, *Mel Boracis* 335, Menthol, 213, Myrrha, 216, Oleum Eucalypti 238, Potassæ Caustica 251, Potassæ Permanganas 255, Quiniæ Sulphas 262, Resorcin 264, Sanitas 266, Sodæ Biboras 270, Sodæ Phenas 273, Thymol 278, Zinci Sulphas 284.

GENERAL INDEX.

Names in Italics refer to Pharmacopœia Preparations.

	DOSE.	PAGE.
Abbreviated and Contracted Terms		359
Absorbent Cotton		309
Acetate of Ammonia, Solution of		110
,, of Lead	1 to 4 grs.	247
Acid Phenic		78
Acidum Salicylici, Gargarisma		315
,, ,, *cum Sodæ Biboratæ, Gargarisma*		315
,, Carbolicum	1 to 3 grs.	78
,, Chromicum		82
,, Gallicum	3 to 20 grs.	83
,, Hydrochloricum		84
,, ,, *Dilutum*	10 to 30 min.	305
,, Nitricum		85
,, ,, *Dilutum*	10 to 30 min.	305
,, Phosphoricum Dil.	10 to 30 min.	87
,, Salicylicum	10 to 20 grs.	88
,, Sulphuricum		90
,, ,, Aromaticum	5 to 30 min.	93
,, ,, ,,		305
,, ,, *Arom: cum Acido Tannico*		306
,, ,, *Dilutum*	5 to 20 min.	306
,, Sulphurosum (Solution)	½ to 1 drm.	91
,, Tannicum	3 to 20 grs.	94
Aconite, Liniment of		332
,, *Tincture of*	5 to 10 min.	349
Aconitum Napellus		96
Actæa Racemosa		98
,, *Tincture of*	30 to 60 min.	350

Names in Italics refer to Pharmacopœia Preparations.

	DOSE.	PAGE.
Active Forces of Medicines ...		... 19
Administration of Medicines ...		... 57
Æther	20 to 60 min.	... 99
,, Spirit of Nitrous	½ to 2 drms.	... 275
Alcohol		... 103
Aloe Draught	... ...	... 331
Aloes Barbadensis		... 104
,, Socotrina	2 to 6 grs.	... 105
Alum Gargle	... ...	... 316
,, *and Chlorate of Potash Gargle*	... ...	... 317
,, *and Starch Powder* ...	... ...	... 345
,, *and Tannic Acid Gargle* ...	... ...	... 317
Alumen	5 to 40 grs.	... 106
Aluminii Chloridum		... 108
Ammoniæ Acetatis, Liquor ...	10 to 40 min.	... 110
,, Aromaticus Spiritus ...	10 to 60 min.	112, 346
,, Carbonas	3 to 10 grs.	... 110
,, *Liquor*	... ...	... 306
,, ,, Fortior		... 111
,, Valerianas	½ to 4 grs.	... 112
Ammonii Chloridum	5 to 30 grs.	... 113
,, Iodidum	2 to 5 grs.	... 115
Amylene		... 115
Amylum Triticum		... 116
Amyl Hydride		... 117
,, Nitris	2 to 5 min.	... 118
Anodyne Drops	... ...	.. 325
,, *Liniment*	... ...	... 333
Anthemis Nobilis		... 120
Antidotes, Table of		... 286
Antimonial Wine	1 to 60 min.	... 357

Names in Italics refer to Pharmacopœia Preparations.

	DOSE.	PAGE.
Antiseptic Tooth Powder	...	311
Aperient Draught	...	231
Approximate Measurement		76
Aqua Destillata		121
,, Fortis		85
Areca Catechu		121
,, Nut		121
Argenti Nitras	$\frac{1}{6}$ to $\frac{1}{3}$ gr.	122
Armenian Bole		134
Arnica Montana		123
,, *Gargle*	...	317
,, *Tincture of*	1 to 2 drms.	350
Aromatic Spirit of Ammonia	10 to 60 min.	346
Arsenic, White		124
Arsenical Paste	...	341
Arseniosum Oxidum	$\frac{1}{60}$ to $\frac{1}{12}$ gr.	124
Astringent Tooth Powder	...	311
Artificial Respiration — Marshall Hall's Method		229
Artificial Respiration — Sylvester's Method		229
Atoms		63
Atropa Belladonna ... (Tincture)	5 to 30 min.	128
Bark, Yellow	tonic, 15 grs. anti-periodic, 60 to 120 grs.	163
,, *Tincture of*	½ to 2 drms.	351
Belladonna ... (Tincture)	5 to 30 min.	128
,, *Liniment*	...	333
Berberiæ Sulphas	tonic, 1 to 3 grs. antiperiodic, 5 to 10 grs.	130
Bicarbonate of Potash	10 to 40 grs.	249
,, of Soda	10 to 40 grs.	270

	DOSE.	PAGE.
Bismuthi Liquor et Amm. Citras ...	$\frac{1}{2}$ to 1 drm. ...	132
,, Subnitras...	5 to 20 grs. ...	133
Bismuthum	...	134
Bivalents	...	66
Black-snake Root	...	98
Blue Pill	1 to 3 grs. ...	343
Bodies, Elementary	...	70
Bolus Armeniæ	...	134
Borax	5 to 30 grs. ...	270
,, *Gargle*	... ...	318
,, *Glycerine*	... ...	323
,, *and Honey*	... ...	335
,, *and Myrrha Gargle* ...	... ...	318
Bromide of Ethyl	...	173
,, of Potassium	5 to 15 grs., and upwards...	255
,, ,, *Gargle* ...	... ...	321
,, ,, *Mixture* ...	... ...	338
Bromine	...	135
Bromum	...	135
Butyl Chloral Hydrate	sedative, 3 to 5 grs. hypnotic, 5 to 15 grs. anæsthetic, 15 to 30 grs. ...	136
Cajuput, Oil of	1 to 5 min. ...	234
Calabar Bean	powder 1 to 3 grs. extract $\frac{1}{16}$ to $\frac{1}{4}$ gr. ...	246
Calcii Sulphidum	$\frac{1}{10}$ to $\frac{1}{2}$ gr. ...	142
Calcis Carbonas	10 to 100 grs. ...	167
,, Carbonas Precipitata ...	...	138
,, Hypophosphis	5 to 10 grs. ...	139
,, Lacto-phosphatis, Syrupus...	1 to 6 drms....	348
,, Liquor	$\frac{1}{2}$ to 2 oz. ...	145
,, Sulphas	...	141

		DOSE.	PAGE.
Calendula Officinalis	(Tincture)	1 to 2 drms.	144
Calomel		alteratíve, 1 to 3 grs. cathartic, 3 to 10 grs.	194
Calx			145
,, Chlorata			146
,, *Saccharata*			306
Camphora		2 to 10 grs.	148
Camphoræ Monobromidum		2 to 5 grs.	150
Camphor Peppermint			212
,, *Compound Tincture of*			350
,, *and Chloroform Drops*			325
,, *and Creasote* ,,			326
,, *and Soap* ,,			326
Camphorated Chloral			307
,, *Spirit*			346
Cannabis Indica	(Tincture)	5 to 30 min.	151
Canton's Phosphorus		$\frac{1}{10}$ to $\frac{1}{2}$ gr.	142
Caoutchouc			269
Carbo Animalis			152
,, ,, Purificatus		20 to 60 grs.	152
,, Ligni		20 to 60 grs.	153
Carbolate of Soda			273
Carbolic Acid			78
,, ,, *Glycerine*			323
,, ,, *Gargle*			313, 314
,, ,, *and Iodine Gargle*			314
,, ,, *Vapour of*			356
Carbonate of Ammonia		3 to 10 grs.	110
,, of Lime (Precipitated)			138
,, Potash (Bicarbonate)		10 to 40 grs.	249
,, of Soda ,,		10 to 40 grs.	270

DOSE. PAGE.
Castile Soap... ... ... 5 to 15 grs. ... 267
Catechu, Areca 121
,, Pallidum ... (Tincture) 1 to 2 drms.... 154
Caustic Lime 145
,, Lunar 122
,, *Paste* 342
,, Potash 250
,, Soda 271
Cera Flava 155
Chalk Precipitated 138
,, Prepared ... ... 10 to 100 grs. ... 167
Chamomile, common 120
Changes effected in medicines by the
action of the organism 21
Charcoal, Animal 152
,, Wood 153
Chemical Notation 61
Chloral Butyl ... } sedative, 3 to 5 grs. } ... 136
,, Crotonis Hydras } hypnotic, 5 to 15 grs.
} anæsthetic, 15 to 30 grs.
,, *Camphorata* 307
,, Hydras ... ... 5 to 30 grs. ... 156
,, *Mixture* 336
Chlorate of Potash ... ... 10 to 20 grs. ... 251
,, ,, *Gargle* 320
,, ,, *Glycerine* 324
,, ,, *and Arnica Gargle* 320
,, ,, *and Borax* ,, ... 320
,, ,, *Mixture* 339
,, *of Soda Gargle* 321
Chloride of Aluminium 108
,, Ammonium ... ... 5 to 30 grs. ... 113

	DOSE.	PAGE.
Chloride of Lime		319
,, Zinc		283
,, ,, *Gargle*		322
Chloramyl		307
Chlorinated Lime		146
,, Soda, Solution of		207
Chlorine Gargle		318
Chloroform Liniment		333
Chloroformum ...(Spirit)	10 to 60 min.	158
Chromic Acid		82
Cinchonæ Flavæ Cort.	tonic, 15 grs. antiperiodic, 1 to 2 drms.	163
Citrate of Iron and Quinine	5 to 10 grs.	175
,, ,, Strychnine	2 to 5 grs.	176
Citrullus Colocynthis ... (Pill)	5 to 10 grs.	164
Classifications of Medicines		44
Climate		10
Cloves, Oil of	1 to 4 min.	235
Cobaltum		164
Cod Liver Oil	1 to 8 drms.	239
Colchicum Autumnale		165
,, *Wine*	10 to 30 min.	358
Cold, as a remedial agent		4
Colouring for Tooth Powder		309
Colocynth Pill, Compound	5 to 10 grs.	342
Colocynthis Citrullus (Comp. Pill)	5 to 10 grs.	164
Collodion		166
Collodium cum Cantharide		307
,, *Flexile*		308
,, *Flexile Stypticum*		308
,, *Stypticum*		308-9
Comparative Table of Doses		77

	DOSE.	PAGE.
Compound Mercurial Pill ...	... ...	... 343
Copper, Sulphate of ...	tonic, $\frac{1}{4}$ to 2 grs. emetic 10 grs.	... 168
Copperas		... 168
Corrosive Sublimate	$\frac{1}{16}$ to $\frac{1}{8}$ gr.	... 189
Cotton Absorbent	... ...	... 309
,, *Styptic*	... ...	... 310
Creasote and Iodine Drops ...	... ...	... 326
,, *Morphia* ,, ...	... ...	... 327
Creasotum	1 to 3 min.	... 167
Creta Præcipitata		... 138
,, Preparata	10 to 100 grs.	... 167
Croton Chloral Hydrate	sedative, 3 to 5 grs. hypnotic, 5 to 15 grs. anæsthetic, 15 to 30 grs.	... 136
,, Oil	$\frac{1}{3}$ to 2 min.	... 236
Cupri Sulphas	emetic, 10 grs. tonic, $\frac{1}{4}$ to 2 grs.	... 168
Cuttle Fish		... 267
Datura Stramonium (Tincture)	10 to 20 min.	... 169
Dentifrice Mialhe's	... ...	... 312
Dentifricium Antisepticum ...	... ...	... 311
,, *Astringens*	... ...	... 311
,, *Ordinarius (Stocken's)* ...	..	... 311
,, *Quiniæ*	... ...	... 312
,, *Saponis*	... ...	... 312
Digitalis Purpurea ... (Tincture)	10 to 30 min.	... 170
Diseases, Index of		... 366
Doses, Comparative Table of ...		... 77
Doses, Table of (see Index)		
Dyads		... 66
Elastic Gum...		... 269

Names in Italics refer to Pharmacopœia Preparations.

		DOSE.	PAGE.
Electricity as a remedial agent			4
Elementary bodies, Table of			70
Epsom Salts	refrigerant, purgative,	10 to 60 grs. ¼ to ½ oz.	209
Equivalent measurement			76
Ether		20 to 60 min.	99
,, Spirit of Nitrous			275
Ethidene Dichloride			171
Ethyl Bromide			173
Eucalyptus and Iodoform Drops			327
,, Oil		2 to 5 min.	236
Exercise as a remedial agent			8
Ferri et Quiniæ Citras		5 to 10 grs.	175
,, *Hypophosphitis Comp: Liquor*			334
,, Iodidum	(Syrup)	½ to 1 drm.	176
,, Perchloridum	(Tincture)	10 to 30 min.	177
,, Persulphatis Liq.			179
,, Phosphas		5 to 10 grs.	181
,, Strychniæ Citras		2 to 5 grs.	176
,, Sulphas		3 to 5 grs.	183
Ferrum Redactum		1 to 5 grs.	182
Flexile Collodion			308
Food as a remedial agent			6
Forms of Medicines			59
Foxglove, Purple	(Tincture)	10 to 30 min.	170
Galla			183
Gallic Acid		3 to 20 grs.	83
,, *and Chlorine Gargle*			314
,, *Mixture*			335
Gargarismata			313
Gargarisma Acidi Carbolici			313

PAGE.

Gargarisma Acidi Carbolici cum Iodo 314

,, ,, ,, *Fort.* 314

,, ,, *Gallici cum Chloro* 314

,, ,, *Hydrochlorici* 315

,, ,, *Salicylici* 315

,, ,, *Salicylici cum Sodæ Bibor:* ... 315

,, ,, *Tannici* 316

,, ,, ,, *et Pyrethri* 316

,, *Aluminis* 316

,, ,, *cum Acido Tannico* 317

,, ,, *et Potassæ Chloratis* 317

,, *Arnicæ* 317

,, *Boracis* 318

,, ,, *cum Myrrhâ* 318

,, *Calcis Chloratæ* 318

,, *Calendulæ* 318

,, *Chlori* 319

,, *Hydrargyri Perchloridi* 319

,, *Krameriæ* 319

,, *Potassæ Chloratis* 320

,, ,, ,, *cum Arnicâ* 320

,, ,, ,, *et Boracis* 320

,, ,, ,, *Permanganatis* ... 321

,, *Potassii Bromidi* 321

,, *Sodæ Biboratis* 315

,, ,, *Chloratæ* 321

,, ,, *Hyposulphitis* 322

,, *Thymolis* 322

,, *Zinci Chloridi* 322

,, ,, *Sulphatis* 323

Gelsemium Sempervirens 184

DOSE. PAGE.
Gelsemium Tincture of .. ... 10 to 20 min. .. 351
General Pharmacology 15
Glycerinum 185
,, *Acidi Carbolici* 323
,, ,, *Tannici* 323
,, *Boracis* 323
,, *Potassæ Chloratis* 324
,, *Sodæ Sulphitis* 324
Grey Powder ... ... {alterative, 1 to 3 grs. / aperient, 5 to 15 grs.} ... 193
Guaiacum, Ammoniated Tincture of ½ to 1 drm. ... 352
,, *Mixture* 337
,, Officinale 186
,, Resina 186
Gun Cotton 258
Gutta Percha 203
,, ,, *Solution of* 345
Guttæ Acidi Tannici 324
,, *Ætheris et Acidi Tannici* 325
,, *Anodynæ* 325
,, *Camphoræ et Chloroformi* 325
,, ,, *et Saponis* 326
,, *Creasoti et Camphoræ* 326
,, ,, *et Iodi* 326
,, ,, *et Morphiæ* 327
,, *Cupri Sulphatis* 327
,, *Eucalypti et Iodoformi* 327
,, *Hæmostaticæ* 327
,, *Odontalgiæ* 328, 329
,, *Thymolis* 330
,, *Thymolis cum Iodo* 330
,, ,, *Fort.* 330

Names in Italics refer to Pharmacopœia Preparations.

	DOSE.	PAGE.
Hæmostatic Drops		327
Hall's, Marshall, Mode of Artificial Respiration		229
Hamamelis, Tincture of	2 to 5 min.	352
,, Virginica		188
Haustus Aloes		331
,, *Aperiens*		331
,, *Rhei*		331
Hazel, Witch (Tincture)	2 to 5 min.	188
Heat as a remedial agent		3
Henbane	Extract 3 to 6 grs. Tincture 15 to 60 min.	196
Hexads		69
Hydrargyri Perchloridum	$\frac{1}{16}$ to $\frac{1}{8}$ gr.	189
Hydrargyrum cum Cretâ	alterative, 1 to 3 grs. aperient, 5 to 15 grs.	193
,, Subchloridum	alterative, 1 to 2 grs. cathartic, 3 to 10 grs.	194
Hydrate of Chloral	5 to 30 grs.	156
Hydride of Amyl		117
Hydrochloric Acid (Dilute)	10 to 30 min.	84
,, ,, *Gargle*		315
Hygienic Remedies		6
Hyoscyamus Niger (Tincture)	15 to 60 min.	196
Hypophosphite of Iron, Compound Solution of		334
,, ,, *Syrup of*	$\frac{1}{2}$ to 1 drm.	347
,, of Lime	5 to 10 grs.	139
,, ,, *Syrup of*	$\frac{1}{2}$ to 2 drms.	347
,, of Potash	5 to 10 grs.	253
,, of Quinine	1 to 3 grs.	260
,, of Soda	5 to 10 grs.	272
,, *Soda Mixture*		340

	DOSE.	PAGE.
Hyposulphite of Soda Gargle	...	322
Imponderable Remedies		3
Index of Diseases		366
Indian Hemp ... (Tincture)	5 to 30 min.	151
India-rubber...		266
Infusum Krameriæ	...	332
,, *Maticæ*	...	332
Iodide of Ammonium	2 to 5 grs.	115
,, of Iron		176
,, ,, *Syrup of*	½ to 1 drm.	349
,, of Potassium	½ to 10 grs.	256
,, ,, *Mixture*	...	339
Iodine		199
,, *Liniment*	...	334
Iodoformum...	1 to 3 grs.	197
Iodum		199
Ipecacuanha ... expectorant, emetic,	½ to 2 grs. 15 to 20 grs.	201
Iridis Rhizoma		203
Iron and Phosphorus Mixture	...	337
,, *and Strychnia*	...	337
,, Citrate of, and Quinine	5 to 10 grs.	175
,, ,, and Strychnia	2 to 5 grs.	176
,, *Mixture*	...	336
,, Muriate of ... (Tincture)	10 to 30 min.	177
,, Perchloride of (Tincture)	10 to 30 min.	177
,, Persulphate		177
,, ,, Solution of		179
,, Phosphate of...	5 to 10 grs.	181
,, Reduced	1 to 5 grs.	182
,, Sesquichloride of (Tincture)	10 to 30 min.	177

Names in Italics refer to Pharmacopœia Preparations.

		DOSE.	PAGE.
Iron, Sulphate		3 to 5 grs.	183
,, Syrup of Iodide of		½ to 1 drm.	176
Isonandra Gutta			203
Jaborandi	(Infusion)	½ to 1 oz.	205
Japanese Camphor		¼ to ½ gr.	212
Jessamine, Yellow	(Tincture)	10 to 20 min.	184
Krameriæ Radix			207
Krameria, Tincture of		1 to 2 drms.	352
Lacto-phosphate of Lime, Syrup of		1 to 4 drms.	348
Lead, Acetate of		1 to 4 grs.	247
Lime, Chlorinated			146
,, Hypophosphite of		5 to 10 grs.	139
,, Solution of		1 to 2 ozs.	145
,, Sulphate of			141
Linimentum Aconiti		... ...	332
,, *Anodynum*		... ...	333
,, *Belladonnæ*		... ...	333
,, *Chloroformi*		... ...	333
,, *Iodi*		... ...	334
Liquor Ammoniæ		... ...	306
,, Ammoniæ Acetatis, B.P.		2 to 6 drms.	110
,, ,, Fortior			111
,, Bismuthi et Ammoniæ Citras		½ to 1 drm.	132
,, *Ferri Hypophosphitis Comp:*		... ...	334
,, Sodæ Chloratæ		10 to 20 min.	207
List of Abbreviations		... ...	359
Litmus			208
London Paste		... ...	342
Magnesia		10 to 60 grs	209
,, Sulphate of	refrigerant, purgative,	10 to 60 grs. ¼ to ½ oz.	209

PAGE.
Magnetism as a Remedial Agent 5
Marshall Hall's Mode of Artificial Respiration 229
Materia Medica, Definition of 1
Maticæ Folium 210
Matico, Infusion of 332
,, *Tincture of* 353
Measurement, Approximate 76
,, Equivalent 76
Measures and Weights 71
Mechanical Remedies 14
Medicine, Active Forces of 19
,, Administration of 57
,, Changes effected in, by the action of the Organism 21
Medicines, Classification of 44
,, Forms of 59
,, Modes of Ascertaining the Effects of 16
,, Parts to which they are applied 38
,, Physiological Effects of ... 21
,, Therapeutical Effects of ... 36
,, the Action of modified, according to the form of administration, and time of exhibition 57
Mel Boracis 335
Mental or Psychical Remedies 2

	DOSE.	PAGE.
Menthol	¼ to ½ gr.	212
Mercury		190
,, Chloride or Subchloride of {alterative, cathartic,	1 to 2 grs. 3 to 10 grs.	194
,, Perchloride of	1/16th to ⅛ gr.	189
,, with Chalk {alterative, aperient,	1 to 3 grs. 5 to 15 grs.	193
Methyl Ethylic Ether		211
Mialhe's Dentifrice		312
,, *Tooth Powder*		313
Mistura Acidi Gallici		335
,, *Chloralis Hydratis*		336
,, *Ferri Aromatica*		336
,, ,, *cum Strychnia*		337
,, ,, *et Acidi Phosphorici*		337
,, *Guaiaci*		337
,, *Neuralgica*		338
,, *Potassæ Chloratis*		339
,, *Potassii Bromidi*		338
,, ,, *Iodidi*		339
,, ,, ,, *cum Potassâ*		339
,, *Sodæ Hypophosphitis*		340
,, *Stomachica*		340
,, *Tonica*		340, 341
Modes of Ascertaining the Effects of Medicines		16
Molecules		64
Monads		65
Monobromide of Camphor	2 to 5 grs.	150
Monsel's Solution		180
Morphiæ Acetas	⅛ to ½ gr.	213
,, Hydrochloras	⅛ to ½ gr.	214

	DOSE.	PAGE.
Muriatic Acid. ... ... (Dil.)	10 to 30 min.	84
Mustard		268
Myrrha	10 to 30 grs.	216
,, *Tincture of*	½ to 1 drm.	353
Neuralgic Pills		344
,, *Mixture*		338
Nitrate of Potash	5 to 20 grs.	253
,, of Silver	⅛ to ⅓ gr.	122
Nitre	5 to 20 grs.	253
Nitric Acid ... ... (Dil.)	10 to 30 min.	85
Nitrite of Amyl	2 to 5 min.	118
,, ,, *Vapour of*		356
Nitrogen, Protoxide of		217
Nitrosum Oxidum		217
Nitrous Ether, Spirit of	½ to 2 drms.	275
Notation Chemical		61
Nux Vomica		276
,, ,, *Tincture of*	5 to 20 min.	350
Oil of Clove	1 to 4 min.	235
Oleum Cajeputi	1 to 5 min.	234
,, Caryophyllorum	1 to 4 min.	235
,, Crotonis	⅓ to 2 min.	236
,, Eucalypti	2 to 5 min.	236
,, Morrhuæ	1 to 8 drms.	239
,, Sanitas		265
Opium	¼ to 3 grs.	241
,, *Tincture of*	5 to 30 min.	354
,, *Wine*	10 to 40 min.	358
Ordinary Tooth Powder (Stocken's)		311
Orris, Rhizome or Root		203
Papaveris Capsulæ		243

Names in Italics refer to Pharmacopœia Preparations.

	DOSE.	PAGE.
Para Cress		274
Paris, Plaster of		141
Parts to which Medicines are applied		38
Pasta Arsenicalis		341
,, *Caustica*		342
,, *Pepsina*		342
Pellitory, Tincture of		354
,, of Spain (Root)		258
Pentads		69
Peppermint Camphor	$\frac{1}{4}$ to $\frac{1}{2}$ gr.	212
Pepsina	2 to 5 grs.	243
Pepsine Paste		342
Perchloride of Iron (Tincture)	10 to 30 min.	177
,, *of Mercury Gargle*		319
Permanganate of Potash		254
,, *of Potash Gargle*		321
Pharmacological Remedies		14
Pharmacology, General		15
,, Special		78
Phenate of Soda		273
Phenic Acid		78
Phosphate of Iron (Syrup)	1 to 2 drms.	181
Phosphoric Acid Dil.	10 to 30 mins.	87
Physical, but imponderable Remedies		3
Physiological effects of Medicines		21
Pilula Colocynthidis Composita		342
,, *Hydrargyri*		343
,, ,, *Subchloridi Composita*		343
,, *Neuralgica*		344

Names in Italics refer to Pharmacopœia Preparations.

	DOSE.	PAGE.
Pilula Podophylli	... ...	... 344
,, *Rhei Composita*	... ...	... 344
Plaster of Paris		... 141
Plumbi Acetas	1 to 4 grs.	... 247
Plummer's Pills	... ...	... 340
Podophylli Resina	$\frac{1}{8}$ to 2 grs.	... 248
Podophyllum Peltatum		... 248
Podophylin Pills	... ...	... 344
Poisons, Antidotes to		... 286
Poppy Capsules		... 243
Potash, Caustic		... 250
Potassa Caustica		... 250
Potassæ Bicarbonas	10 to 40 grs.	... 249
,, Chloras	10 to 20 grs.	... 251
,, Hypophosphis	5 to 10 grs.	... 253
,, Nitras	5 to 20 grs.	... 253
,, Permanganas (Liquor)	2 to 4 drms.	... 254
Potassii Bromidum	5 to 60 grs.	... 255
,, Iodidum	$\frac{1}{2}$ to 10 grs.	... 256
Precipitated Chalk		... 138
Prepared Chalk	10 to 100 grs.	... 167
Protoxide of Nitrogen		... 217
Psychical or Mental Remedies ...		... 2
Pulsation per minute at various ages		... 77
Pulvis Aluminis cum Amylo ...	... ...	... 345
Pyrethri Radix		... 258
Pyroxylin		... 258
Quadrivalents		... 69
Quantivalence		... 64
Quicksilver		... 190

Names in Italics refer to Pharmacopœia Preparations.

	DOSE.	PAGE.
Quillaya, Tincture of	...	354
,, Saponaria...		259
Quiniæ Hypophosphis	1 to 3 grs.	260
,, Sulphas	1 to 10 grs.	261
Quinine, Citrate of Iron and	5 to 10 grs.	175
,, *Tooth Powder*	...	312
Quinquivalents		69
Rectified Spirit, Strong	...	346
Reduced Iron	1 to 5 grs.	182
Remedies, Hygienic		6
,, Pharmacological		14
,, Physical, but imponderable		3
,, Psychical, or Mental		2
,, Surgical and Mechanical		14
Resorcin	1 to 3 grs.	260
Respiration per minute at various ages		77
Rhatany Gargle	...	319
,, *Infusion of*	...	332
,, Root		207
Rhubarb Draught...	...	331
,, *Pills, Compound*	...	344
Saccharated Lime...	...	306
Salicin		89
Salicylic Acid	10 to 20 grs.	88
,, ,, *Gargle*	...	315
,, ,, *and Borax Gargle*	...	315
Sal Volatile	...	346
Sandarach ...		265
Sanitas		265
Sapo Durus ...	5 to 15 grs.	267
Sepia Officinalis		267

	DOSE.	PAGE.
Sexivalents		69
Silver, Nitrate of		122
Sinapis		268
Siphonia Elastica		269
Soap Bark		259
,, *Tincture of*		354
,, *Tooth Wash*		355
,, Hard		267
,, *Tooth Powder*		312
Soda, Bicarbonate of	10 to 40 grs.	270
,, Carbolate or Phenate of		273
,, Caustica		271
,, Chlorinated, Solution of	10 to 20 min.	207
Sodæ Biboras	5 to 30 grs.	270
,, Bicarbonas	10 to 40 grs.	270
,, Hypophosphis	5 to 10 grs.	272
,, Phenas		273
,, Sesquicarbonas	10 to 40 grs.	270
Solutio Guttæ Perchæ		345
Special Pharmacology		78
Spilanthes Oleracea		274
Spirit of Nitrous Ether	½ to 2 drms.	275
Spiritus Acidi Tannici		345
,, *Ammoniæ Aromaticus*		346
,, *Camphoræ*		346
,, *Rectificatus Fort.*		346
Starch, Wheat		116
Stomachic Mixture		340
Stramonium (Tincture)	10 to 20 min.	169
Strychnos Nux Vomica (Tincture)	5 to 20 min.	276
Styptic Collodion		308-9

	DOSE.	PAGE.
Styptic Cotton	... ...	... 310
Sugar of Lead	1 to 4 grs.	... 247
Sulphate of Copper Drops ...	... ...	... 327
,, of Lime		... 141
,, of Magnesia refrigerant purgative	10 to 60 grs. ¼ to ½ oz.	... 209
,, of Quinine	1 to 10 grs.	... 261
,, *of Zinc Gargle*	... ...	... 323
,, of Zinc astringent emetic	1 to 2 grs. 10 to 30 grs.	... 284
Sulphide of Calcium	⅒ to ½ gr.	... 142
Sulphite of Soda Glycerine	... ...	... 324
Sulphuric Acid ... (Dilute)	5 to 20 min.	... 90
,, Ether	20 to 60 min.	... 99
Sulphurous Acid Solution ...	½ to 1 drm.	... 91
Surgical and Mechanical Remedies		... 14
Sweet Spirits of Nitre	½ to 2 drms.	... 275
Sylvester's Mode of Artificial Respiration	...	... 229
Symbols and Atomic Weights, Table of		... 70
Syrupus Calcis Hypophosphitis ...	... ...	... 347
,, ,, *Lacto-phosphatis*	1 to 4 drms.	... 348
,, *Ferri Hypophosphitis* ...	½ to 1 drm.	... 347
,, ,, *Iodidi*	½ to 1 drm.	... 349
Table of Doses, Comparative ...		... 77
,, ,, (see Index)	... ...	... 376
Table of Elementary Bodies, their Symbols, &c.		... 70
Table of Poisons, Antidotes, &c. ...		... 286
,, Quantivalents		... 64
,, Weights and Measures ...		... 71
Tannic Acid	3 to 20 grs.	... 94

Names in Italics refer to Pharmacopœia Preparations.

PAGE.
Tannic Acid Gargle 316
,, ,, *and Pyrethrum Gargle* 316
,, ,, *and Ether* 325
,, ,, *Drops* 324
,, ,, *Glycerine* 323
,, ,, *Spirit* 345
Tetrads 68
Therapeutical Effects of Medicines ... 36
Therapeutics, definition of 1
Thymol 277
,, *Gargle* 322
,, *Drops* 330
,, *and Iodine* ,, ... 330
,, *Vapour* 357
Thymolis cum Iodo, Guttæ 330
,, *Guttæ* 330
Tinctura Aconiti 349
,, *Actææ* 350
,, *Arnicæ* 350
,, *Camphoræ Composita* 350
,, *Cinchonæ Flavæ* 351
,, *Gelsemii*... 351
,, *Guaiaci Ammoniata* 352
,, *Hamamelis* 352
,, *Krameriæ* 352
,, *Maticæ* 353
,, *Myrrhæ* 353
,, *Nucis Vomicæ* 353
,, *Opii* 354
,, *Pyrethri* 354
,, *Quillayæ* 354

	DOSE.	PAGE.
Tinctura Valerianæ Ammoniata		355
Tonga		278
Tonic Mixture		340, 341
Tooth-Ache Drops		328, 329
,, *Powder, Colouring for*		309
,, ,, *Mialhe's*		313
,, *Powders*		311, 312
,, *Wash, Quillaya*		355
Triads		67
Trivalents		67
Unguentum Veratriæ		356
Univalents		65
Valeriana Officinalis (Tincture)	½ to 1 drm.	279
Valerian, Ammoniated Tincture of		355
Valerianate of Ammonia	½ to 4 grs.	112
,, of Zinc	½ to 6 grs.	285
Vapor Acidi Carbolici		356
,, *Amyl Nitritis*		356
,, *Thymolis*		357
Vaseline		280
Veratria		281
,, *Ointment*		356
Vinum Antimoniale		357
,, *Colchici*		358
,, *Opii*		358
Vitriol, Blue		168
Weights and Measures		71
Yellow Bark		163
,, Wax		155
Zinci Chloridum	½ to 1 gr.	283

Names in Italics refer to Pharmacopœia Preparations.

		DOSE.	PAGE.
Zinci Sulphas ...	Astringent Emetic	1 to 2 grs. 10 to 20 grs.	... 284
,, Valerianas ...	... ...	½ to 6 grs.	... 285

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